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TO

Engineering Periodicals,

FROM **1888** TO **1892**, INCLUSIVE.

COMPRISING

ENGINEERING; RAILROADS; SCIENCE; MANUFACTURES AND TRADE.

BY

FRANCIS E. GALLOUPE, M.E.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, S.B.: MEMBER AMERICAN SOCIETY OF MECHANICAL ENGINEERS, ETC.

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FROM THE PREFACE TO THE FIRST VOLUME.

PROGRESS in the development of material resources, in recent years, has created a large and increasing volume of engineering literature in periodicals which contain valuable papers and information, much of which is too recent, or fragmentary in character, to be found in books, or elsewhere.

This work is designed to make accessible to engineers in all branches of the profession, to special investigators, librarians, editors and others, the more important papers and articles contained in leading American and English periodicals during the last five years. To keep the list from becoming unwieldy, it was decided to limit, besides the period covered, the number of periodicals, and with these restrictions the compiler has selected each reference given by personal examination of the articles in the files.

The index is by subjects, alphabetically arranged, and makes available information now practically buried in the mass of engineering literature, or only to be extracted by the aid of some one hundred and fifty indices, and the loss of much time.

BOSTON, *May*, 1888.

PREFACE.

THE purpose of this Index is to supply a reference list to the important works and matters relating to engineering and its allied interests, during the period covered. It is believed that no other index fills the field of this work, which shows at a glance the principal information published on any given subject in the leading periodicals during the past five years. The periodicals indexed having been selected from a list of over one hundred and sixty periodicals will, it is thought, sufficiently cover the field of practical engineering, as nearly all important works and matters are contained among these representative papers. Foreign papers are represented by translated articles reprinted in the periodicals indexed, and there are besides incidental references to numerous others.

Within the limits set, the aim has been, by a critical examination of each article throughout the files, to preserve references to all that of permanent technical value, or practical use.

BOSTON, *June*, 1893.

JOY W. ... JULIA ... RAGGI

ABBREVIATIONS.

addr. address.
agric. agricultural.
Am. American.
amt. amount.
anal. analysis.
ap. apparatus.
aqued. aqueduct.
atmos. atmosphere.
aut. automatic.
bat. battery.
Bess. Bessemer.
Brit. British.
bull. bulletin.
cal. calculating, calculation.
capac. capacity.
cath. cathedral.
C. E. civil engineer.
Cens. Census.
centrif. centrifugal.
chem. chemistry.
condens. condensing, condensation.
cor. correspondence
corrug. corrugated.
Corp. Corporation.
Co's. Companies.
cyl. cylinder.
dec. decrease.
dept. department.
des. designer, design.
desc. description.
diam. diameter.
discov. discovery.
discuss. discussion.
distil. distillation.
distrib. distribution.
dyn. dynamometer.
econ. economy, economical.
effic. efficiency.
elec. electric.
eng. engineering.
es. estimate.
estab. establishment.
evap. evaporation.
exam. examination.
excav. excavating, excavation.
exhib. exhibition.
exp. expense.
expt. experiment.
frt. freight.
galv. galvanometer.
gov. governor.
h. house.
h. p. horse power.
hist. history.
hor. horizontal.
hos. hospital.
ht. height.
hydr. hydraulic.
illum. illuminating.
imp. improvement.
inc. increase.
incand. incandescent.
indus. industry, industrial

ins. insurance.
Inst. Institute.
inv. inventor, invention.
locom. locomotive.
M. E. mechanical engineer.
mach. machine, machinery.
manuf. manufacture.
max. maximum.
min. minute.
mo. motive.
mt. mountain.
munic. municipal.
mut. mutual.
n. note.
nav. navigation.
obs. observations.
pass. passenger.
pat. patent.
pneu. pneumatic.
pop. population.
por. portrait.
pph. pamphlet.
pro. proceedings.
proc. process.
prog. progress.
pyrom. pyrometer.
R. railroad.
recip. reciprocating.
refrig. refrigerating.
rep. report.
resist. resistance.
Ry. railway.
san. sanitary.
sec. second.
Soc. Society.
spec. specification.
sq. square.
st. street.
stat. statistics.
str. steamer.
sup. supplement.
teleg. telegraph.
teleph. telephone.
temp. temperature.
topog. topographical.
util. utilization.
vac. vacuum.
vel. velocity.
ventil. ventilation.
wrt. wrought.
wt. weight.

NAMES OF PERIODICALS INDEXED,

WITH THEIR ABBREVIATIONS.

Cassier's Magazine. *Cassier's*
Electrical Engineer, N. Y. *El Eng*
Electrical Review, London. *El Rev Lond*
Electrical Review, N. Y. *El Rev*
Electrical World, N. Y. *El Wld*
Engineer, The, London. *The Eng*
Engineering, London. *Eng*
Engineering Magazine, N. Y. *E Mag*
Engineering and Mining Journal, N. Y. *E & Min*
Engineering News, N. Y. *E News*
Engineering Record, N. Y. *E Rec*
Journal of the Franklin Institute, Phila. *F Inst*
Power, N. Y. *Pwr*
Proceedings of the Institution of Civil Engineers, London. *Inst C E*
Proceedings of the Institution of Mechanical Engineers, London. *Inst M E*
Proceedings of the Society of Arts, Boston. *Soc Arts Mass*
Railroad and Engineering Journal, N. Y. *R & Eng*
Railroad Gazette, N. Y. *R Gaz*
Scientific American Supplement, N. Y. *Sc Am Sup*
Street Railway Journal, N. Y. *St R J*
Technology Quarterly, Boston. *Tech Q*
Transactions American Institute of Mining Engineers, N. Y. *Am Min*
Transactions American Society of Civil Engineers, N. Y. *Am C E*
Transactions American Society of Mechanical Engineers, N. Y. *Am M E*

OTHER PERIODICALS INCIDENTALLY INDEXED IN PART.

American Engineer; Annales des Ponts; Building News, London; Century Magazine; Cosmopolitan Magazine; Forum; Le Genie Civil; Harper's Monthly; Industries; Iron Age; Journal of the Assoc. of Eng. Societies; The Locomotive; New England Magazine; Nineteenth Century; North American Review; Scribner's Magazine, etc.

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DRAWING press, al. in, O. Smith *Am Min* v * 18, 18-**90,** do. *Eng* * Aug 29-**90**
ELECTRIC production, Brown *El Eng* * Apr 29-**91,** do *El Rev Lond* May 22, 29, June 26-**91,** do *El Rev* May 2-**91,** do (full) *El Wld* May 2, Crocker, discuss. 16-**91**; Stoke-on-Trent plant, England (full) *E & Min* * Sep 22-**88**; reactions, Bucherer, Jan 6, Farmer, 27-**91**; elec. smelting, Boby *Sc Am Sup* * July 13-**89**; Farmer, July 25, reactions in Aug 1-**91**
FERRIC cake (for sizing paper) *Sc Am Sup* Nov 9-**89,** *Chem Tr J*
FLUORIDE, electrolysis of, Minet *El Eng* Dec 10-**90,** *El Rev Lond* Dec 19-**90,** *Compt R*
GRABAU'S method, ed. *Eng* Dec 20-**89,** abs. *Inst C E* v 101-**90,** *An Mines, Genie Civil* v 16-**89,** v 17 May -**90**
HEROULT proc., Dewey *Am Min* * v 18-**90**; *El Wld* * Nov 17-**88,** * *Industries; Eng* Oct 10-**90**; (full) *E & Min* Dec 1-**88,** and Cowles, Lowrey cor. Apr 27-**89**; Grabau's method, abs. *Inst C E* v 101-**90,** *Genie Civil* v 16-**89,** 17 May -**90**; *Sc Am Sup* * Dec 8-**88**
INSTRUMENTS of precision, Blake *Am Min* v 18-**90**
MANUFACTURE and industry, value, Dagger, ed. *El Rev Lond* Apr 8, July 15, Aug 19, Sep 2-**92**; Deville-Castner proc. *Eng* Mar 22, ed. * Aug 2-**89,** Lauffen-Venhausen works * Feb 20-**91**; improvements in, n *E & Min* May 24, Grabau's method, Ichon Aug 16-**90,** *An Mines;* and uses, Hunt *E News* May 5, expt. with, Christie 19-**92,** do., Hunt (full) *F Inst* Apr -**92**; extraction on a commercial basis, Seymour, Roscoe (very full) *Sc Am Sup* Aug 24-**89,** Hall proc. * Feb 1, (pure) (full) * June

Aluminum MANUFACTURE
7-**90,** value, Dagger Aug 15-**91,** Hunt (full) Apr 23, May 14 etc -**92**; *The Eng* * Nov 21-**90**
ORE, Nichols, n *Am Min* v 16-**88**
RAILROAD work, in, ed. *R Gaz* Nov 14-**90,** Hunt, Mar 27-**91**
SPECIFIC heat of, Richards *F Inst* Feb -**92**
STEEL, in steel castings, Keep *Am Min* * v 18-**90,** Hadfield (very full) v * 19-**91,** in steel ingots, Langley, iron and steel direct determination, Drown, McKenna v 20, 20-**92**; Keep *Eng* May 23-**90**; strength, etc. (full) *E News* Oct 11-**90**; Hadfield *Sc Am Sup* Apr 4-**91**
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U. S. production, Packard *E & Min* July 11-**91**
USES, Hunt *R & Eng* July -**92**; and applics., Addenbrooke *Sc Am Sup* June 18-**92,** *J Soc Arts Lond;* Dagger *The Eng* June 6-**90**
WROUGHT iron and steel castings, in, Keep *E & Min* Aug 30-**90,** *Am Min*

Amalgams, electric conductivity of, Weber, abs. *Inst C E* v 92-**88,** *Central Elek* -**87**

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Ammonia and tar recovery from blast furnace gases *E & Min* * May 12, 19-**88**; liquor utilization, Humphreys *Sc Am Sup* May 19, use as refrigerating agent, Lightfoot, 26-**88,** production from coal, Mond (full) * Sep 28-**89**; properties, De V. Wood *Am M E* * v 10-**89,** experimental determination of latent heat of, Jacobus * v 12, 12-**91**; liquid, composition and manufacture, Strombeck *F Inst* July, n Aug -**92.** See also under CHEMISTRY
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Ampere, Andre M. n *Sc Am Sup* Dec 1-**88**

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Angle-iron bevelling machine *The Eng* * June 6-**90**; tests, Loweth *E Rev* Feb 1-**90**, *Inst C E*
PRISMS, Gieseler *E News* * May 12-**88**
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Archbould, Ralph, *Inst C E* v 100-**90**
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GOUR NOIR viaduct, Vezere river, Uzerche, France, inset *E News* * Aug 15-**92**

Arches, Mt. Vernon viaduct *E News* * Sep 1-**92**

Segmental and two-nosed catenaries, Alexander *Eng* * July 12 -**89**

Skew or spiral construction, Cincin. & Rich. R., Paret *Lehigh Eng J* Feb -**88.** See also Bridges, skew arch, Oakley.

Architects, Am. Inst., pro. *E Rec* Oct 27-**88,** constitution, Dec 7-**89,** pro. Oct 31, Nov 7-**91**

Architect's and engineer's fee, German schedule *E Rec* June 15; convention Nov 30-**89**; legal decision, Dec 15, 22-**88**; the architect and the engineer, ed. *R & Eng* Dec -**90,** *Pop Sci;* offices, Burnham, Rookery, Chic. *E Rec* * Jan 11, Shepley * Feb 15, Wilson, Phil. * 22, Chandler, Phil.* Mar 1, Boston, June 7-**90,** organization, Post, N. Y. * Nov 7, McKim's, N. Y. * Dec 5-**91**

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Design, elements of, Statham (full) *E Rec* * Jan 14-**88,** do. (full) *Sc Am Sup* * Feb 18, 25 * May 19, 26 * June 9, 16-**88**; logical basis of, Walker *Tech Q* May -**90**; engineering, Freitag *Sc Am Sup* * Aug 22-**91**

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American Fine Arts Soc. bld., N. Y., doorway, inset *E Rec* * Dec 31-**92**

Apartment house, Yosemite, N. Y., entrance *E Rec* * June 27-**91**

Cathedral, Albi, France, inset *E Rec* * Apr 18-**91**; builders of the cathedrals, Snow *N E Mag* * Dec -**92**; Siena cath., Pisano *Sc Am Sup* * Oct 19-**89**

Chateau Epreville-Martainville, France, inset *E Rec* * Sep 26; (Lot) France, inset * July 25-**91**; Josselin, Brittany, inset * Jan 23-**92**

Chicago, Ill., Herald building, inset *E Rec* * Nov 14-**91**; sketches in *Sc Am Sup* * Dec 3-**92**

Architecture, CHURCH at Chateauneuf (Charente), France, inset *E Rec* * Sep 19; of St. Paul, Dax (Landes), France * June 6-**91**

CITY Hall, the, in Am., Ferree, insets *E Mag* * Nov -**92**; Bremen, Germany, inset *E Rec* * Dec 12-**91**; Cologne, Ger., entrance, inset * Apr 2; Hotel de Ville, Poitiers, France, inset * Dec 10-**92**

CLUB house, Century, N. Y., doorway, inset *E Rec* * Dec 19-**91**; Montauk, Brooklyn, inset * Apr 9; Catholic, N. Y., inset * Dec 17-**92**

COLUMBIAN exhib., U. S., Chicago, Van Brunt *Century* * May— * Aug -**92**

COUNTRY houses, Cambridge, etc., inset *E Rec* * Jan 17-**91**; Cohasset, Mass., interior, inset * Apr 23-**92**; English, inset * Aug 29-**91**; Arthur Little's, Boston, inset * Feb 20; Geo. Macculloch, Morristown, N. J., inset * Mar 26; Marblehead Neck, interior, inset * Jan 16-**92**; Swampscott, Mass., inset * Aug 15, Elihu Thomson's do., inset * May 9-**91**

COURT house, Beauvois, France, inset *E Rec* * Nov 19-**92**

FRANKFORT-on-Main, Ger., Union R. pass. station, insets *E Rec* * Sep 5-26 * Dec 5-**91**. See also BUILDING

GALLERY Victor Emanuel, Milan, inset *E Rec* * July 30-**92**

LIBRARY, Tilden Trust, N. Y., proposed, Bigelow *Scrib.* * Sep -**92**

MEAT market, old, Haarlem, Holland, inset *E Rec* * Feb 14-**91**

MOBBERLY Hall, Cheshire, England, inset *E Rec* * Nov 26-**92**

MUSEUM building and arrangement, Ferree *E Mag* * Nov -**91**; Amsterdam, Holland, inset *E Rec* * Feb 28; Hague, do., inset * May 23 **91**

MUSIC Hall, N. Y., main entrance, inset *E Rec* * Feb 13-**92**

PALACE of Justice, Hague, Hol., inset *E Rec* * Mar 7-**91**

RECEIVING vault, Woodlawn cem., N. Y., inset *E Rec* * Feb 27-**92**

RESTAURANT, Frankfort Palm garden, inset *E Rec* * Oct 31-**91**

ROMERBURG, Germany, inset *E Rec* * Dec 26-**91**

SWISS Vecchia inn, Maloja Pass, inset *E Rec* * Apr 16-**92**

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Areas of segments *Lancet* * Jan **90**, calculation, table, June -**91**. See also INTEGRATOR

Argall, Philip, por. *E Sci Mo* * Dec 5-**91**

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Armada (Spanish), defeat in 1588 *Sc Am Sup* * Aug 25-**88**

Armor, cellulose *E News* Dec 1-**88**, steel, tests at Annapolis, Sep 20, 27 * Oct 4-**90**. See also GUNNERY and armor

Arms and armor of ancient Japan, Baba *Soc Arts Mass.* -**88**

Army, Austro-Hungarian, Kuhn *Harper's M* * June; Italian, Goiran * Aug -**92**; European armies, Dodge *Forum* July -**92**; of Kukuanaland, Michaelis *Sc Am Sup* Oct 26-**89**, *F Inst*

Arrol, William, por. *Eng* * Feb 28-**90**

Arsenal, Woolwich *The Eng* * Oct 2-**91**

Arsenic determination, Canby *Am M E* v 17-**89**, *Birm* May -**88**; *Locom* June -**92**

Art, fine, composition and selection of a subject, Ellis *Sc Am Sup* * June 1-**89**; use of cloisonne for decoration, Heaton (full) May 9; pictures, durability painted with oils and varnishes, Laurie June 20; Miller, Aug 22; decorative treatment of natural foliage, Stannis (full) * Nov 21, 28 * Dec 5, 19, 26-**91**

Artesian wells. See WELLS, artesian

Artificial limbs, Mark's *F Inst* * May -**89**

Artillery service in the rebellion, Tidball *J Mil Ser Inst Mag* May -**92**. See also GUNNERY and armor; GUNS

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Ashburner, Charles A., Lesley *Am Min* v 18 -**90**

Ashworth, John *Inst C E* v 95 -**89**

Asphalt, uses, Greene, insets (full) *Am Min* * v 17 -**89,** do. *Soc Arts Mass* -**89**; industry, France, abs. *Sc Am Sup* * July 19-**90,** *Genie Civil;* plates for water-proof construction *E News* * Nov 1; price of, Oct 25-**90**; Trinidad *E Rec* Nov 12-**92**; use in irrig. works, Cal., Purcell *Inst C E* v 110 -**92**; nature and uses, Greene *Soc Arts Mass* -**89.** See also PAVEMENTS; ROADS; STREETS

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Astronomy, two remarkable coincidences, d'Auria *F Inst* Oct -**88**; as applied to land surveying, Downes *Inst C E* * v 108 -**92**; recent science, Kropotkin *19th Cent* May -**92**; how to measure the invisible, Parkhurst *Sc Am Sup* Apr 18; the story of the universe, Huggins * Sep 12; central lateral motion of the worlds of space, Wheeler, Dec 5; astronomer's work in a modern observatory 19-**91**; new, Ball, Feb 27-**92.** See also PHOTOGRAPHY, stellar; SUN; TELESCOPES, etc.

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ARCTURUS, recent conceptions, Knight, *Sc Am Sup* July 4-**91**

AURORA Borealis *Sc Am Sup* Mar 16-**89**

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COSMOSPHERE for teaching, Bailey *Soc Arts Mass* -**88**

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HELIOSTAT, Grubb's, Smithsonian Inst., Wash. *Eng* * May 16-**90**

INSTRUMENT works, Grubb's, Dublin *Eng* Dec 14-**88**

LICK observatory, Mt. Hamilton, Cal. *Eng* * July 6, 27, inset * Aug 10, 17, 31 * Sep 7 * Oct 26-**88**; Holden *Sc Am Sup* Sep 29-**88**; latest discovs. Nov 15-**90.** See also PHOTOGRAPHY, ap., Lick observ.

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MERCURY *Sc Am Sup* * Apr 26-**90**

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MILKY way, Gore *Littell's* Apr 30-**92**

NEPTUNE, discovery (great discoveries) *Locom* Dec -**89**

OBSERVATORIES, Levander *Sc Am Sup* Aug 29, (full) Sep 5-**91**; Halsted ob. spectroscope *Eng* * July 22-**92**; Pekin ob. *Sc Am Sup* * Jan 12-**89**; Warner ob. *Eng* * Jan 27-**88**. See also ASTRON., Lick-Sayre observs.

SAYRE observ., Beth., Pa., deflection of plumb line at, Frescoln *Lehigh Eng J* June -**88**

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VENUS planet *Sc Am Sup* * Nov 12-**92**

Atchison, Arthur T. *Inst C E* v 105-**91**

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Autographs, foreign electricians *El Wld* * May 28–**92**

Automatic machines, Lynde's *Eng* Jan 25–**89.** See also SLOT machines

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Baker, Benjamin, por. *Eng* * Feb 28–**90**

Baker, W. L. *J Assoc Eng Socs* Nov –**88**

Balbach, Edward, n por. *E & Min* * Mar 28–**91**

Baldwin, John *Inst C E* v 107 –**92**

Baling press, Boomer portable *The Eng* June 29–**88,** Cyclone hydr. * Sep 4–**91**

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Ballard, Stephen *Inst C E* v 104 -**91**
Balls, hollow copper *Locomotive* * Oct -**91**
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Bancroft, Hubert H., por. *Sc Am Sup* * Oct 15-**92**
Band-saw mill, the Am., Suplee *Cas* * Feb -**92**; saws for heavy timber, ed. *Eng* Aug 30-**89**
Barium (metal) *Locom* Aug -**92**
Barnes, F. W., por. *E & Min* Jan 16-**92**
Barometers, Gieseler *E News* Aug 4-**88,** the aneroid, do. *F Inst* * Nov -**89,** do. use for measuring heights *The Eng* Mar 13-**91,** do. use in Western Mass. by Geol. survey, Cutter, *Tech Q* Sep -**87**
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Barrels, cement, etc., cubic capac. n *E News* Feb 15, 22, Mar 29-**90**
Barrett, John P., por. *El Wld* * Dec 6-**90**
Barry, William H. *Inst C E* v 100 -**90**
Bartol, B. H. *Am M E* -**88,** *F Inst* June -**88**
Barytes and umber mines and refining mills, Cleator Iron Ore Co., Caldbeck Fells, Addison, inset *Inst C E* * v 102 -**90**
Bassett, Alexander *Inst C E* v 92 -**88**
Bateman, John F. L. (full) *Inst C E* v 97 -**89**
Bates, Henry W., por. *Pop Sci* * Nov -**92**
Batterbee, Ranson C. *Inst C E* v 95 -**89**
Battle-ships. See NAVIES, names of countries
Bayly, George H. *Inst C E* v 93 -**88,** 98 -**89**
Bayonne, Port of *Eng* * Dec 6-**89**
Bazalgette, Joseph W. *Eng* Mar 20-**91,** (full) *Inst C E* v 105 -**91,** *The Eng* Mar 20-**91**
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Beams and girders, the continuous girder as a tipper, Lindenberger *Am C E* * v 26 -**92**; theoret. strength, cor. *Eng* July 1-**92.**
E News cross-sections, unsymmetrical, Johnson * Feb 4-**88,** loading long girders on cars, movable frame * Jan 9-**92**
F Inst jointed bow, theory, Werner * May-* July, Sep, Oct; continuous, indeterminate multipliers, Lindenberger, Dec -**88**
Inst C E jointed bow, Werner abs. v 95 -**89**; cast iron and steel, expts. on strain in outer layers, Segundo (full), inset * v 98 -**89**; braced, stresses and deflections, Stewart * v 109-**92**

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R & Eng contin. framed, stress in, Hiroi May -**88**; lattices, stresses on, method of obtaining, Robertson *Sc Am Sup* * Mar 24-**88**; expts., Sondericker, inset *Tech Q* * Oct -**88**

The Eng struts, stiffness of, expts., Mason Coll. Jan 6; lattice girders, graphic evaluation of stresses in flanges, Robertson Mar 16, do. Stokes, cor. Apr 27, do. Parsey, cor. May 18, stresses in statically undetermined systems, Ende, cor. 18; transverse strength of beams, D. Clark, June 1, 22, 29-**88.** See also BRIDGES; BUILDINGS; GIRDERS; ROOFS, etc.

Bearings, materials without lubricants, Hedges anti-friction *El Rev Lond* Aug 12-**92,** graphite self-lubricating *E News* * Feb 8-**90,** May 19-**92,** do. *The Eng* Aug 19-**92**; metals, phosphor-bronze *Eng* July 29-**92,** *R & Eng*

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LAGAN, Belfast *The Eng* * Aug 22, 29, 29-**90**
LANSDOWNE, at Sukkur, Indus river. See BRIDGES, Sukkur
LOA viaduct, Antofagasta R., Bolivia 336 ft., highest in world *E News* * May 18-**89,** *R & Eng* * June -**89,** *Sc Am Sup* * Mar 15-**90,** *The Eng* * Apr 19, 19, inset * 26-**89**
LONDON, England, Blackfriars, Thames river, Lond. Chat. & Dover R., Cruttwell, discuss., inset *Inst C E* * v 101 -**90,** *The Eng* Mar 21-**90**
THAMES river, proposed *E Rec* * Nov 19-**92,** do. Ratcliffe to Rotherhithe, and ed. *The Eng* * Oct 28, 28-**92**
TOWER. See BRIDGES, Tower, London
LONG span, discussion of, Lindenthal *E News* * Mar 3, 10, 24; very long span, proposed design, Warren * June 30-**88**; and North river, N. Y., Lindenthal, Nov 9, 16, 23-**89**; table *R Gaz* May 2-**90**
LYONS, Rhone river, Nansouty, abs. *Inst C E* v 106 -**91,** * *Genie Civil* v 19 -**91**; great, Fournere & Croix, Rousse *Sc Am Sup* * Oct 24-**91**

Bridges, MALLECO viaduct, Chili, Mamy, abs., inset *Inst C E* * v 104-**91** *Genie Civil* * v 18 -**91**
MANARVATER timber viaduct, New Zealand *E Rec* * Jan 4-**90**
MANHATTAN, Harlem river, N. Y. *Eng* * May 4-**88,** *E News* * Feb 4, Sep 8-**88.** See also BRIDGES, Wash.
MARBLE Creek viaduct *E Rec* * Apr 18-**91**
MARENT Gulch high viaduct, No. Pac. R. *R Gaz* * Apr 26-**89**
MARGHERITA, Rome *R & Eng* * June -**92,** *Industries;* Turin, Po river, abs. *Inst C E* v 92 -**88,** *Giornale Civ* -**87**
MASONRY, with semi-free joints, Cunningham *Eng* * May 6, *Sc Am Sup* * June 25-**92,** *An Ponts*
MATTABESSETT river, E. Berlin, Ct., inset *E News* * Apr 2-**92**
MAUCH Chunk suspension, Hildebrand *E News* * Feb 25, Mar 10-**88**
MEMPHIS R., Miss. river, Tenn. *E News* * May 12, inset * June 16, inset * Sep 15-**92;** erection *E Rec* June 20 * July 25 * Oct 17-31 * Nov 7-**91** * May 14-**92;** and ed. *R Gaz* * Feb 21 -**90,** June 26-**91** * May 13-**92;** *The Eng* Aug 3-**88**
MICHIGAN Cen. standard, with 3 inside guard rails *R Gaz* * Nov 1-**89**
MISSOURI Pacific, inset *E News* Feb 14-**91**
MOLDAU viaduct, at Cervena *E News* * Apr 19-**90;** Huss, abs., *Inst C E* v 98 -**89** * *Woch ost Ing* -**89**
MONTREAL, proposed *E News* May 31-**90**
MORAND, Rhone river, Lyons *The Eng* * Oct 16, 23, 30-**91**
NEEDLES, cantilever, Col. river, Cal., Atlan. & Pac. R., inset *R Gaz* * Apr 25-**90**
NEWARK Dyke, Grt. Northern R. *The Eng* * Mar 7, 21-**90**
NEW Brunswick, N.J., Albany st. masonry arch *E News* * Apr 16-**92**
NEW London, Ct., Thames river. See BRIDGES, Thames river
NEW Orleans, Miss. river, projects *R Gaz* * May 16 * July 11-**90**
NEWPORT viaduct, Isle of Wight, inset *Eng* * Jan 25-**89**
NEW York Cen. double track with solid plate floor *R Gaz* * May 17-**89**
NEW York and N. J., Clark report, inset *R Gaz* * Sep 23 *Sc Am Sup* Oct 22-**92.** See also BRIDGES, Harlem, Manhattan, North river, railroad, Washington, etc.
NEW York, Prov. & Boston ballast floors *E News* * Mar 1-**90**
NEW York Rapid Transit R. viaduct, proposed *E News* * Oct 31-**91**

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method of obtaining, Lindenberger *F Inst* * Nov -**89**; and river crossings, Otagawa *R & Eng* * Nov * Dec -**88,** Jan -**89**; repairing under water, Rossignol * Sep -**90,** *An Ponts*
PILE and trestle, Robinson *E News* Apr 7-**88.** See also BRIDGES, railroad; PILING; TRESTLES
PINS, fibre strain in, J. Johnson *E News* * Jan 28, Du Bois, cor. Mar 10, strains in, Fowler, cor. * 24; and eye-bars, proportions, Stowell, Mar 31-**88**
Po river, at Casalmaggiore, Parma-Brescia R., erection *E Rec* * May 5-26-**88,** abs. *Inst C E* v 95 -**89,** *L'Ingeg Civil* -**88**
POLLET swing. See BRIDGES, draw-bridges
PONTOON, Indian boat, Fenner *R & Eng* * Sep -**88**
PONY lattice, N.Y., West Shore & B. R. *R Gaz* * Sep 21-**88**
PORTABLE, Brochocki's *Eng* * Apr 5; Paris exhib. * Aug 2-**89**; *E News* May 26 * Sep 1-**92**; French iron, Talansier *E Rec* * Jan 12-**89** * *Genie Civil;* metallic, for quick erection, Pichault; abs. *Inst C E* v 91 -**88,** *Assoc Ings Liege* -**87**
PORTAL bracing, anal. of stresses, Cain *E News* July 13-**89**
PORTSMOUTH & Gosport floating, Harris *Eng* * Oct 7, *E Rec* Oct 15, *Sc Am Sup* * Nov 19, *The Eng* * Sep 23-**92,** *Inst M E*
POUGHKEEPSIE, cantilever, Hudson river, construction, O'Rourke, insets (full) *Am C E* * v 18 -**88,** inset *E & Min* Feb 2-**89,** *E News* Jan 7-**88** * Feb 16-**89,** abs. *Inst C E* v 96 -**89,** T. Clarke *Sc Am Sup* * May 19-**88,** *The Eng* Sep 21-**88**
PROVIDENCE, R.I., Point st., guard gates, Bullock, insets *Am C E* * v 20-**89,** *E Rec* * Nov 28-**91**
QUERETARO aqueduct, Mexico *E News* * June 2-**88**
QUINDARO, caissons and cribs, inset *E News* * Apr 4-**91**
RADIAL truss, F. Smith, cor. *E News* * Apr 11-**91**
RAILROAD, wts. of, Du Bois, inset, new form of strut, Strobel *Am C E* * v 18-**88**; Am., Cooper, discuss., insets (very full) * v 21, 21 -**89**; R. bed for bridge structures, Woolson *Am M E* * v 9 -**88**; bridging canons lengthwise, Hinckley, inset * v 26-**92**; Burge, Walton, Cruthwell *Eng* Mar 7-**90**; Am. viaducts, Greiner * Aug 14-**91**; Glenury viaduct renewing in Scot., Caled. R., inset * Sep 2, Earn viaduct * 16-**92**; Am., Cooper, (full) *E & Min* * Oct 5-26 * Nov 2, 9, 30-**89,** do. *E News* * July 6-**89**; Am., origin and evolution, Greiner * June 6-**91**; use of steel for, symposium, Mar 26, Apr 2, Aug 25-**92**; wrt.

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iron deck beam, test. Boller *E Rec* * Dec 19-**87**; new form of wrot. stricted abs. *Inst C E* v 96-**89**; Dufferin. Hawkesbury. discuss. insets (full) * v 101-**90**; Am. origin and evolution. *Greiner R Gaz* * June 5-**91**; recent construction of. Ritchie *Sc Am Sup* Jan 17-**91**, *J Assoc Eng Soc*; spacing cross-girders in. MacKenzie *The Eng* * Mar 6-**91**; Moenchenstein failure. Switz. Ende * Feb 19-**92**. See also under BRIDGES. Howe truss. and names of places and railroads. Forth—Loa—London. Blackfriars—Oakley. etc.; PILING; TRESTLES

DESIGNING. disputed points in. Waddell. discuss. insets (very full) *Am C E* * v 26-**92**, *E News* Dec 12. 26-**91**, *E Rec* Dec 12. 26-**91**, Jan 9-**92**, *R Gaz* Oct 14. 28. Nov 4. 25-**92**

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STRAINS, produced by loaded cars of 90,000 lbs. capacity, Blakely cor. and ed. *E News* May 10-**90**. See also BRIDGES. strains and stresses

TIMBER structures, western Am. *Eng* * Sep 23, Howe truss 180 and 250-ft. span, inset * Oct 7-**92**

RAO Shri Pragmalji, Mandvi, Kutch. Sykes *Inst C E* v 103-**91**

RED river concrete piers. Purdon *E News* * June 2-**88**

RED Rock cantilever. Col. river. At. & Pac. R., foundations *E News* * Sep 27; Waddell. inset detail sheet * Oct 4, 4, correction. 11-**90**; Rowe *E Rec* Dec 19, 26-**91**, erection * May 7 * July 2-**92**, *Am C E*; abs. *Inst C E* v 103-**91**

RIPARIA. Snake river. Wash. T. *Eng* * Nov 6, *Sc Am Sup* * Dec 19-**91**

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ROCHESTER, N.Y., Driving Park ave., Genesee river *E Rec* * July 18 * Aug 1, *R Gaz* * July 17-**91**
ROCKFORD, Ill., State st. plate girder highway, inset *E News* * Feb 27-**92**
ROPE and military applics., Gisclard *Sc Am Sup* * Oct 17-**91,** *Genie Civil*
RULO, report, Morison, bk. review *R & Eng* Feb -**91**
ST. Guistina viaduct, So. Tyrol, inset *E News* * Feb 1, 1-**90**
ST. JOHN cantilever *E Rec* * Mar 16, 30-**89**
ST. LAWRENCE river, Lachine, Can. Pac R., inset *Eng* * Apr 13 -**88**
ST. Louis, Mo., Merchant's, Miss. river, inset *Eng* * May 15, inset * June 5, 5, inset * 12-**91,** inset *E News* * Dec 21, 21 -**89**; Grand ave., inset * July 18-**91**; Maline Creek * Feb 20 -**92**; Grand ave (suspen.) *E Rec* * June 6, 20, 27 * July 4 * Aug 8-29 * Oct 3, 10-**91**
ST. Mary's Falls, Sault Ste. Marie, wind strains on, diags. *E News* * May 25-**89**; Massy * Oct 18-**90**; canal and dam *E Rec* * Mar 22-**90**
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ST. Peters, Dadore river *E Rec* Aug 10-**89**
SIBLEY, Missouri river, Chic. S. F. & Cal. R., Chanute, discuss., insets (full), construction, Wallace, superstructure, Breithaupt *Am C E* * v 21, 21-**89,** *Eng* July 5, 5-**89,** *E News* * Feb 18-**88,** abs. *Inst C E* v 99 -**90,** (dates) n *R Gaz* Feb 17-**88**
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SIOUX City, Monson report, pph. *R & Eng* * May -**91,** *R Gaz* Oct 3-**90**
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SKIPTON & Ilkley, England *The Eng* June 15, 15-**88**
SOULEUVRE viaduct, France, Vire, St. Lo. & Caen R., piers *E News* * June 28-**90,** *E Rec* * Jan 10, 17-**91,** *Genie Civil, R & Eng* * Mar, *Sc Am Sup* * Apr 5, *The Eng* * Jan 24-**90**
SMITHVILLE, Mo., Chic. Kan. C. & Tex. R., inset *E News* * Jan 24-**91**
STAGING for girders bridges *The Eng* June 1-**88**
STARRUCCA viaduct, N.Y. L. Erie & W. R. *E News* * Sep 1-**88**

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STEUBENVILLE, P. C. & St. L. R., temporary support, renewing pier *E News* * July 12-**90**

STOCKTON-on-Tees, Victoria br., Neate *E News* * Sep 8-**92,** *Inst C E*

STONE. See ARCHES; BRIDGES, arched and names

STRAINS and stresses, Booth *Am C E* v 20 -**89**; greatest truss stress and position of load, etc., Eddy, inset (very full) * v 22 -**90**; slide moment diag. for computing, Greiner *E News* Apr 14; web stresses with curved chords, Lindenberger, cor. * 21 -**88**; safe stresses in, Ottewell, diag. * Feb 23; allowable strains in old, Fowler, cor. Apr 6; strains cal. by graph. method, Baldwin, diag. * Sep 28 * Oct 12-**89**; device for cal. strains, Howe, Jan 11; mechan. comput. of stresses, Fletcher * Mar 1, May 10, do. Webb, cor. * Apr 12; strains produced by loaded cars of 90,000 lbs. capacity, Blakely, cor. and ed. May 10; method of cal. strains in Whipple truss, W. Baldwin (math.) * Aug 30-**90**; computing strains, German practice, Waddell Dec 12-**91** * Feb 27-**92**; secondary stresses in framed structures, Hiroi *R & Eng* * Oct -**88**

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SUBAQUEOUS viaduct *E News* * Feb 28-**91**

SUKKUR cantilever, Indus river, Parsey, inset *Eng* * Mar 9, 9-**88**, inset * Jan 4-**89**; erection *E Rec* * Apr 9-23-**92**; the Lansdowne, Robertson, insets *Inst C E* * v 103-**91**, do. *The Eng* * Jan 9-**91**

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SUSQUEHANNA river, Phil., Harrisb. & Pitts. R. *R Gaz* * Feb 12 -**91**

SWISS No. Eastern standard plate girder *E News* * Mar 26-**92**,

TARANTE, Italy, n *Sc Am Sup* * Jan 14-**88**

TAVISTOCK & Shillamill viaducts, Plymouth & S. W. Junction R., England *The Eng* * June 6-**90**

TAY viaduct, Dundee, Barlow *Eng* May 18-**88**, discuss., insets *Inst C E* * v 94 -**88**, construction, Inglis *R Gaz* June 29-**88**

TESTING, Nansouty, Cuenot, abs. *Inst C E* v 108 -**92**, *Genie Civil* * v 19 -**91**, *An Ponts* July -**91**

Bridges, THAMES river, New London, Ct., N. Y. Prov. & Boston R., inset *Eng* * Apr 10 * May 8, 15-**91**; *E News* May 19-**88**; *E Rec* * Oct 11, 18-**90**; *R & Eng* * June -**88**, Nov -**89**, report, Nov -**90**; draw-br. pivot pier *R Gaz* * Nov 7-**90**; lower single span, opening, proposed *The Eng* * Mar 18-**92**. See also BRIDGES, draw-bridges

TIDE-water Pipe Co. suspen., Mauch Chunk, Pa. *E News* * Feb 25-**88**

TIMBER rolling-br., in Drowtheim, Cauer, abs. *Inst C E* v 92 -**88**, *Zeit Bauwesen* -**87**

TORKHAM, India, launching of, Ollenbach *The Eng* Jan 13-**88**, *Ind Engr*

TOWER, London, inset *Eng* * Sep 23-**92**; *E News* * July 6-**89**; *E Rec* May 21-**92**, *R & Eng* * Oct -**90** * Oct -**92**, * *Industries; The Eng* * Aug 16, 30, 30, Sep 6, 6 * Oct 18, 18 * Nov 8, 8, 15 * Dec 20, 20-**89** * Apr 17-**91**

TRANSANDINE, inset *Eng* * Dec 2-**92**

TRANSFER, Harsimn's Cove, Jersey City, Bensel, discuss., insets *Am C E* * v 19 -**88**

TRESTLES. See TRESTLES.

TRUSSES, formulas for wt. of, Du Bois *Am C E* * v 18-**88**; abs. do. *Inst C E* v 96-**89**; failures in 1889 and for 11 years, ed. *E News* Apr 19, 19; arch, Gilman, Aug 16-**90**; truss deflection, J. Johnson *R Gaz* Aug 1-**90**

TURIN, Po river, Margherita, abs. *Inst C E* v 92 -**88**, *Giornale Civ* -**87**

TWO Medicine, Great No. R., St. Paul, Minn. & Manitoba R *E News* * Mar 19-**92**

TWYFORD viaduct, Didcot, Newbury & Southampton R. *The Eng* * Dec 18, 25-**91**

VAN Buren, Ark. river, construction, Purdon, discuss., insets (full) *Am C E* * v 20 -**89**, piers erection, do *E Rec* * Jan 11-**90**

VANDEVANDA, Penn. R. *E News* * Jan 12-**89**

VERRUGAS viaduct, Oroya R., Peru, inset *Eng* * Apr 17; Olcott *E & Min* * Jan 24-**91**; *E News* * July 27-**89** * May 9-**91**

VIAUR, Du., viaduct Carmaux & Rodez R., proposed, inset *E News* * Nov 30, 30 *R & Eng* * Nov, *Genie Civil; The Eng* * Dec 27-**89**

VICTORIA, Stockton-on-Tees, Neate, inset *Inst C E* * v 109 -**92**; Kilmarnock *The Eng* Aug 30-**89**

VIENNA, Stephanie, Danube canal, abs. *Inst C E* * v 92 -**88**, *All Bauz* -**87**

Bridges, WASHINGTON. Harlem river. 181st st., N. Y. city. W. Hutton (bk.) *E & Min* * Sep 27-**90**; designs. inset *E News* * Dec 27-**90**; (Manhattan bridge) Hutton. bk. n *E Rec* Jan 31-**91**

WEEHAWKEN viaduct and pass. elevators. T. Brown. Blakeley. insets *Am C E* * v 27 -**92**, inset *R Gaz* * Jan 22-**92**

WEIGHTS of. DuBois. inset *Am C E* * v 18-**88**; formulas. Mosscrop *E News* Mar 17-**88**

WHARFE river. Yorkshire *The Eng* May 25-**88**

WHITE'S plate girder. Del. Lack. & W. *R & Eng* * July -**91**

WILLAMETTE river Howe truss timber. Albany. Or., Or. R. & Nav. Co. *R Gaz* * Apr 19-**89**, *Sc Am Sup* * Mar 17-**88**, *Eng*

WINNER. Kansas City. Mo., details. inset *E News* * Mar 15. inset * July 19, 19-**90**

Bridging canons lengthwise. Hinckley. insets *Am C E* * v 26 -**92**

Bright, Charles T. (full) *El Rev Lond* May 11, *Inst C E* v 93 -**88**, por. *Sc Am Sup* * July 7. *The Eng* May 11-**88**

Briquette-making machine, Paris exhib. *Eng* * May 24-**89**

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Sc Am Sup Dec 21-**89** * Oct 11-25, physics at, Nov 29-**90**; *The Eng* Preece addr. Sep 7, Bramwell addr. 7-**88**, Sep 13, 20 -**89**, Leeds, Abel addr. Sep 5 * 12, Noble addr. 19-**90**, Aug 28-**91**, Unwin, Pres. addr. Aug 5-19-**92**

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Brooklyn, navy yard *Eng* Oct 17-**90.** See also BRIDGES — RAILROADS, Brooklyn, etc.
Brooks, David, por. *El Wld* * June 6, *F Inst* July -**91**
Brown, C. E. L., por. *El Wld* * Oct 17-**91**
Brown, John *Inst C E* v 95 -**89**
Brown, Samuel *Inst C E* v 109 -**92**
Brown, Thomas *Inst C E* v 92 -**88**
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Brush, Charles F., por. *El Rev* * Aug 2, *Harpers W* July 26-**90**
Buarque, Antonio L. *Inst C E* v 100 -**90**
Buchholz, John A. A. *Inst C E* v 101 -**90**
Buddicom, William B. *Inst C E* v 91 -**88**
Buell, Madison, por. *El Eng* * Aug 19-**91**
Buenos Ayres, gas supply, Stevenson *Inst C E* v 103 -**91**
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Buildings and building, notes *E Mag* Oct -**91.** See also ARCHITECTURAL eng; ELECTRIC light stations; EXHIBITIONS; FOUNDATIONS; MILL construction; RAILROADS, buildings; RAILROADS, electric power stations; ROOFS, etc.
AGRICULTURE, World's exhib., Chic. *Eng* * Apr 29, * May 6-**92**
ALLEGHENY County Courthouse *E Rec* * Nov 10-**88**
ANCHORING of, Goetz *Sc Am Sup* * Dec 21-**89**
ARCADE, Cleveland *E Rec* * Mar 21, 28 * Apr 4-**91**
ARMORY, O. N. G., Cincin. O. *E Rec* * Dec 7, 21-**89;** 12th reg't, N. Y. * Jan 7-**88**
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AUDITORIUM, Chicago *Eng* * Apr 3, 24-**91,** *E Rec* * Apr 12, construction * Nov 22, 29-**90,** * Feb 21, * Mar 7-**91;** *Locom* May -**90**
BATHS, European public *E Rec* * Apr 18, special bath-room * Oct 3-**91**
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BOILER shop, Pitts. Locom. works *R Gaz* * Feb 7-**90**
BOSTON Chamber of Commerce *E Rec* * May 7, 28, * June 4; building law, Aug 6-**92**
BRIGHTON beach hotel, Coney Is., moving *E News* Apr 7-**88,** *R Gaz* * Apr 6-**88**

Buildings. [illegible] foundations, [illegible] and st. full) [illegible] 1892; fireproof construction, [illegible] Feb 16–[illegible]; [illegible] construction of compressible gas, [illegible] Nov [illegible] the [illegible] [illegible] construction Dec [illegible] [illegible] 1892; see also Buildings, Auditorium, etc.

[illegible] Buildings, large wooden, some [illegible] June [illegible]; roof truss, [illegible] [illegible] [illegible]; [illegible] training and [illegible] [illegible]; [illegible], reservoir [illegible] Dec 30 [illegible]

[illegible] Kansas [illegible] [illegible] 1892; the city hall [illegible] Pierce, [illegible] [illegible] Nov 1892

[illegible] [illegible] [illegible] Feb [illegible]

[illegible] [illegible] Down Town [illegible] [illegible] [illegible] Dec 10 [illegible] Permanent [illegible] Dec [illegible]

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[illegible] [illegible] [illegible] large wooden [illegible] June [illegible]

[illegible] [illegible] [illegible] Nov [illegible]; [illegible] May [illegible]

[illegible] [illegible] [illegible], building [illegible] [illegible] [illegible] Jan 10–[illegible]; [illegible] [illegible] [illegible]

[illegible] [illegible] Bridge works [illegible] [illegible] Apr [illegible] [illegible] May [illegible]

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[illegible] house, Barclay st., [illegible] [illegible] Nov [illegible]

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PECOS Valley, New Mexico *E News* * Oct 17-**91**

PENN., L. Erie & Ohio river, proposed *E News* * Mar 21, do. *R Gaz* Apr 10-**91.** See also CANALS, Lakes

QUEBEC-Montreal ship channel *Sc Am* Mar 16-**89,** *Eng*

RICHMOND, Va., eng. problem at, Adams *Am M E* * v 12 -**91**

SAULT Ste. Marie, ed. *Eng* Sep 14-**88,** Sep 5-**90**; *E News* Jan 4, traffic for nine seasons, Mar 1-**90**; lock accident *R & Eng* * Oct -**90**; and Suez, traffic *R Gaz* Apr 17-**91**; *Sc Am Sup* Oct 20-**88**

SIBERIA, new waterway, abs. *Inst C E* v 92 -**88,** *Osterreich Ing* -**88**; Mas *R & Eng* Sep -**89,** *An Ponts*

SIDHNAI system, MacLean, abs. *Inst C E* v 103 -**91**

SPAIN, inland nav., abs. *Inst C E* v 104 -**91,** *An Construct* Madrid -**90**

Canals, SOUTH Yorkshire junction, proposed *The Eng* * Oct 17–**90**

SUEZ, traffic growth *E & Min* Apr 20–**89**; ships passed through *E News* Apr 28, June 9–**88**, report, July 6–**89**, traffic diagram * July 11–**91**; and Sault Ste. Marie traffic *R Gaz* Apr 17–**91**; lighting of *The Eng* * Dec 6–**89**

SUPERIOR & Mich. lakes, proposed, maps *E News* * Mar 22–**90**

WASTE weir, aut., Foote, inset *Am C E* * v 18 –**88**

Canes and sticks manuf., Jackson *Sc Am Sup* May 11–**89**; cane contrivances * Nov 26–**92**

Canning fruit *Sc Am Sup* Jan 4–**90**

Capital and labor, the rights of *Blackwood's Mag* Dec –**91**; conflicts, Howell, bk. review *Eng* Aug 29–**90**; the remuneration of, ed. Dec 11–**91**; does capital need high-priced labor, Partridge *E Mag* Aug –**92**; how to secure harmony between, Hewitt *E & Min* Oct 11–**90**, *Am Min*; the consumer, Rice *Forum* July –**92**; are business profits too large, Mann *Pop Sci* Nov –**92**. See also LABOR; MANUF. industries net profits

PROFIT-sharing, co-operation, B. Jones *Eng* Sep 19–**90**; industrialism, Esson *El Rev Lond* Nov 7, 14–**90**; gain-sharing Towne *Am M E* v 11 –**89**; profit sharing enterprises, ed. *Eng* Feb 13, ed. July 31–**91**, Gilman *Soc Arts Mass* –**89**

Carbon, bisulphide manuf. and purification, Singer (full) *Sc Am Sup* * Apr 20–**89**; funnel, for filtering, Drown *Tech Q* May –**88**; heat of combustion, Berthelot *R Gaz* July 26–**89**, *Compt r*

Carbonic acid liquid manufacture *Sc Am Sup* * June 27–**91**

Carborundum, Guy *Sc Am Sup* July 16–**92**

Carnegie, Andrew, por. *E & Min* * July 4–**91**

Carpenter, R. C., por. *Cassier's* * Jan –**92**

Carpet beating machines *Sc Am Sup* * Apr 21–**88**; industry, Phil. Apr 13–**89**; weaving, Persian, Vries, Aug 29–**91**, *J Soc Arts Lond*

Carr, Henry *Inst C E* v 95–**89**

Carr, Mark W. *Inst C E* v 93–**88**

Carriages, elastic traction, Lemoine's *Sc Am Sup* * Oct 8–**92**; torsion in, King *The Eng* * Aug 28–**91**

Carrick, John *Inst C E* v 101 –**90**

Cars and carriages, Railroad, rolling stock, Paris exhib. *Eng* Aug 30–**89**, local R's, inset * Apr 4–**90**; standards, good and bad *E News* June 9–**88**

Cars, ACCOUNTANT'S Assoc. pro. *R Gaz* June 29-**88**

AXLES, steel, Coffin *Am M E* * v 9 -**88**; effect of temp. on strength, Andrews *E News* * Feb 18, 18, 25-**88**, Nov 14-**91**, do. inset *Inst C E* * v 94 -**88**, insets * v 105 -**91**; and wheels, machine for rolling, Aitken's ap., pats. *R & Eng* * Sep -**90**; wheels and track, discuss. *R Gaz* Feb 17; 60,000-lb. cars, standard, proposed * June 8-**88**, do. Rhodes and ed. * Feb 22, 22, Mar 1, discuss. 29, M. C. B. * Oct 11; steel, tests, Pencoyd works, Nov 8-**89**

AXLE and journal-boxes, lubricating, cost, Randolph *Am M E* * v 11 -**90**; stamped steel *Eng* * June 20-**90**; Macnee's dust proof *E News* * Dec 15-**88** * May 2-**91**; bearing for 60,000-lb. cars, M. C. B. Assoc. com. report * June 14-**90**

R Gaz anti-friction metals, Bennett, Jan 18, 25; Erie journal-box * Sep 20; and bearings, Adams, Nov 22-**89**; 60,000-lb. cars, proposed M. C. B. * June 20-**90** * June 19-**91**; stamped steel * July 18; standard, proposed * Aug 22-**90**; the Timms *The Eng* Apr 13-**88**

BRAKE, Kane's *Sc Am* Feb 16-**89**. See also RAILROADS, brakes

BRUNIG, Paris exhib. *Eng* * Aug 23-**89**

BUENOS Ayres & Ensenado Port, buffet smoking *The Eng* * Feb 20-**91**

BUFFER, Westinghouse friction *R Gaz* * Nov 2 * Dec 21-**88** * Feb 21-**90**, *The Eng* * Mar 14-**90**

BUILDER'S Assoc., Master, pro. *E News* June 23-**88** * June 13, 20-**91**, June 16 * 23-**92**, reports *R & Eng* * July -**92**, table, inset (full) *R Gaz* June 15 * 22-**88**, June 28, July 5-**89**, June 13 * 20-**90**, June 12, 19-**91**, June 17, inset * 24-**92**

CALEDONIAN R., inset *Eng* * Feb 21-**90**

CATTLE, So. R., France, wagon, Paris exhib., inset *Eng* * Nov 8-**89**; the Canda *R Gaz* * Mar 2-**88**

CHOCK, for stopping *E News* * Aug 9-**90**

CLEARANCE in width required by *R Gaz* * Nov 9-**88**

COAL, Chic. Rock Is. & Pac. standard, inset *E News* * Aug 11 -**92**; Tex. & Pac. *R & Eng* * Nov -**91**; standard * Apr * May -**92**

COUPLERS, standard, dimens. *E News* * Jan 28-**88**; contour lines, etc., Barnes * Jan 3-**91**; breakages, service record and ed. * Feb 15, 15-**90** * May 12-**92**; and brake legislation *R & Eng* Mar, May -**92**; vertical plane, in service, ed. *R Gaz* Jan 17; frt., C. B. & Q., broken * June 6-**90**; vertical plane,

Car COUPLERS
Barnes, and aut. air brakes * Jan 2, Feb 6, ed. 6; what constitutes a defect in ver. plane, discuss. 23, mixed unlocking gear disadvantages * Nov 13-**91**; strength, Forsyth, Mar 4, 11 -**92**
BLACKSTONE's platform and *R Gaz* * July 15-**92**
BUHOUP's *E News* * August 25-**92**
CHICAGO, the *R Gaz* * Nov 14-**90**
DREXEL *R Gaz* * May 15-**91**
EMPIRE *R & Eng* * June -**92**
FOX aut. vertical plane *R Gaz* * June 20-**90**
HINSON *E News* * Aug 1-**91**
HUSELTON aut. *R Gaz* * Apr 11-**90**
JANNEY frt., safety stop for *E News* * Jan 2-**92**; *R Gaz* * Feb 17-**88**, vs. Miller, ed. Apr 11, evolution of * June 6, life of, diagrams of broken * Nov 7-**90**, with Bentley's vestibule * May 1 -**91** failures * May 13-**92**
KEYSTONE *E News* * Nov 2, *R Gaz* * Nov 8-**89**
MASTER Car Builder's aut. *E News* introduction of, ed. Mar 28, R's equipped with, inset map * Apr 25, 25 * June 13, standard gauges for * Sep 19-**91**, strength, Forsyth * Mar 5-**92**
R & Eng form of contour lines, report * May -**88**, standard gauges * Oct -**91**, possibilities of, discuss., Eastwick (full) * Apr, May -**92**
R Gaz * Apr 20-**88**, at interchange points, ed. * July 25 * Aug 18, on curves * Oct 3-**90**, broken knuckles * Jan 2, cost, ed. May 15, report * June 12, standard gauge * Sep 18-**91**, M. C. B. Assoc. action, Apr 22, testing machine * Sep 2-**92**
ROBERT-Eastwick *R Gaz* * June 6-**90**
TESTING, method *R Gaz* * Aug 19, testing machine * Sep 2-**92**
THURMOND frt. *R Gaz* * June 5-**91**
TROJAN *E News* * Nov 29, *R Gaz* * Dec 5-**90**
UNION aut. *R Gaz* * Jan 30-**91**
VAN Dorston and buffer *R Gaz* * Dec 14-**88**
DERRICK, 15-ton, Penn. *R Gaz* * Oct 18-**89**, 10-ton, Balt. & O. * Jan 9-**91**
DRAW-bars, height of M. C. B. com. report *E News* June 28-**90**; Graham's draft rigging, Penn. R., discuss. *R Gaz* * Mar 29, 29; Cushing's stop * Oct 25; Chic & N. W. * Nov 1-**89**; Safford aut. * Oct 17-**90**; Butler draft gear * Apr 1; draft gears for frt. cars, Barnes * June 3-**92**

Cars, DUMP. Can. Pac. *E News* * July 21-**88**; rotating * July 12 -**90**; iron. No. R. of France *R & Eng* * July -**88**; the Goodwin * July -**89**; Thacher compressed air * Dec -**92**, do. *R Gaz* * Nov 11-**92**; George's Creek & Cumb. * Jan 25-**89**; and gondolas. Goodwin. Jan 31; standard. B. & A. * Mar 7-**90**

FRANCE, experimental. West. R., Paris exhib. *Eng* * Oct 4; local R's 2d class. Paris exhib. * Nov 29; 1st class. So. R, inset * Dec 13-**89**; State R * July 4-**90**; pass. *R Gaz* * May 15 -**91**. See also CARS, dump—freight

FREIGHT, Goodfellow & Cushman's *Eng* * Dec 7-**88**; unloading by steam shovel *E News* * Oct 5-**89**; construction imp., Barnes * Jan 30; lubrication, cost. Dec 1-**92**

R Gaz relative cost of car load and less, Fink, Feb 3; depreciated values. table. Apr 27; ballast and plow, Roger's * July 27-**88**; equity of per diem and mileage plan, Yardley, Wattson. cor. Mar 15. Apr 5; relative econ. of large and small capac., ed. Apr 26; springs. bolster. tests. Hazlehurst. diags. * Oct 4-**89**; end platforms for. ed. Jan 10; housing for gondolas and stock * Mar 28; ventil., Pancoast's system * Apr 11; mileage decrease on home roads. Wattson. July 11; handling and distrib. on West Shore Oct 10-**90**; Harvey steel box * June 5-**91**; construction and design. Barnes * Jan 29, Lamont's steel * Feb 5-**92**

BALT. & O. 50,000-lb. box, details *R Gaz* * Mar 27-**91**, iron box *R & Eng* * Dec -**92**

BELGIUM. Grand Cen. R. wagon. Paris exhib. *Eng* * Oct 11-**89**

BUFFALO, Roch. & Pitts. 60,000-lb. box and truck *R Gaz* * Dec 19-**90**

CHESAPEAKE & O., combination *R Gaz* * Feb 1-**89**; stone * Sep 23-**92**

CHICAGO. Bur. & Q. standard *R Gaz* * June 21-**89**; & N. W. standard. 50,000-lb., box (full) * Jan 10-**90**; Rock I. & Pac. coal. standard. inset *E News* * Aug 11-**92**

DENVER & Rio Grande box, standard gauge *R Gaz* * Oct 9-**91**

FRANCE. So. R. cattle wagon. Paris exhib., inset *Eng* * Nov 8, platform wagon. do. * Dec 20-**89**

GERMAN composite *R Gaz* * Dec 27-**89**

HOELLENTHAL R., inset *Eng* * Mar 13-**91**

INTERCHANGE rules *R Gaz* May 24-**89**, com. report. May 22 -**91**

LAKE Shore. 30-ft. standard *R Gaz* * Dec 30-**92**

Cars, Freight, LEHIGH Valley, 50,000-lb. standard *R Gaz* * June 8; twin hopper bottom gondola, 60,000-lbs. * Sep 14-**88**; 50-ton capac. platform car * Aug 16-**89**

NEW York, L. Erie & W. side-dump, 80,000-lbs. capac. *E News* * Apr 19, 19-**90**

NEWPORT News & Miss. Valley gondola *R Gaz* * Apr 6-**88**

NORTHERN Pac. hopper side chute *R Gaz* * Apr 5-**89**

PENN. 100,000-lb. *R Gaz* * May 11-**88**; 40-ton side-dumping gondola * Mar 15-**89**

SPAIN, 13-ton iron ore wagon, Parcocha R., inset *Eng* * July 17-**91**

TUBE-frame, Jefferds *Eng* Nov 7 * 28-**90**, do. goods wagons, insets (full) *Inst M E* * Oct -**90**, do. cor. *R Gaz* June 5-**91**, do. and effect on expenses of R's *The Eng* * Nov 14-**90**

GATES, the Gold platform (N.Y. eleva. R.) *R Gaz* * Nov 30-**88**; B. & A. * Mar 21-**90**

GREAT So. & W. of Ireland, composite *Eng* * Oct 19-**88**

GREAT Western, England, corridor cars *E News* Mar 26 * Apr 28, *The Eng* * Apr 15-**92**

HEATING, Bache's heater, com. report *F Inst* * Aug -**88**; Leland hot water heater *R Gaz* * Sep 11-**91**; hot water continuous, Safety Co. * Sep 6-**89**

STEAM, notes on, Baldwin, a safety system, Towne *Am M E* * v 9 -**88**; safe train system, Gibbs' car *El Wld* * June 21 -**90**; appliances *Eng* * Mar 4-**92**; Waitt *E & Min* * Oct 1-**92**

E News steam from the locomotive, com. report, June 30; Baldwin * Aug 18-**88**; non-pressure system * May 18-**89**; by direct steam, June 7 * Nov 22: prog. of steam heating, inset map and ed. (full) * June 7, 7; Consol. Car-heating Co. systems * Sep 6, do. aut. temp. regulator, 20-**90**; diagram * May 16-**91**; standard couplings * June 16; Waitt, Sep 29 -**92**; P. Atkinson *Lehigh Eng J* June -**89**

R Gaz aut. control of heat, Temple, Apr 13; expts., discuss. 20 * May 18; Stand. Car Htg & Ventil. Co. continuous system * June 15; M. C. B. expts., report, inset table and ed. 22-**88**; essential elements of, W. Johnson, Feb 1; continuous, cir. replies, Mar 22, Apr 12-**89**; Consol. Car H. Co. couplings * May 2; econ. of, Sewell, Nov 7-**90**; Halladay, Sep 23, Waitt, 30-**92**; econ. of, Sewall *Sc Am Sup* Nov 29 -**90**; Lanza * *Soc Arts Mass* -**89**, *Tech Q* * Oct -**88**; and couplers *The Eng* Jan 27-**88**

Cars, Heating, Steam, CALEDONIAN R., exhaust steam ap., Drummond *Inst C E* * v 92 -**88,** *The Eng* * Jan 4, 4-**89**
CHICAGO, Mil. & St. P. contin. *R Gaz* * Jan 13-**88,** light and heat tender (full) * June 13-**90**
ERIE system *R Gaz* * Feb 3-**88**
GIBBS' safe train system *El Wld* * June 21-**90,** steam hose coupler *E News* * Dec 5-**91**
GOLD continuous system, Lehigh Valley *R Gaz* * Mar 9; storage, test, May 11-**88**; * Aug 30-**89**; coupling and joints * Mar 21; * June 6; coil and Baker stove * Dec 26-**90**
MARTIN coupling *R Gaz* July 18-**90**
MCELROY system, test *R Gaz* Apr 6-**88**
NORTH Western system, coupling and trap *E News* * Mar 30 -**89**; *R Gaz* * Jan 27-**88**
PENN. R., Ely *E News* * Nov 15, *F Inst* * Nov *R & Eng* * Dec -**90**; Williams' system, expt. *R Gaz* Feb 24-**88**; continuous * Mar 22-**89**
ROBERTS' system, *R Gaz* * Apr 17-**91**
SEWALL contin. system, hose coupler *E News* * Nov 21-**91**; *R Gaz* * Jan 20-**88**
WILLIAMS' system, Penn. R., expt. *R Gaz* Feb 24-**88**
INDIAN State carriages, Rajah *The Eng* * Nov 4-**92**
INSPECTION, Susque. Coal Co. *E News* * Aug 17; Penn. R. * 31-**89**; the Ionia *R Gaz* * Apr 26-**89**; joint insp., com. report, June 19-**91**; saloon, So. E. R. *The Eng* * Aug 14, 21-**91**
INTERCHANGE rules, M. C. B. report *R Gaz* Apr 8-**92**
IRON and steel, construction, steel plate and malleable iron in, M. C. B. report *E News* * June 14-**90**; steel stock car, inset * July 11-**91**; iron con., pros and cons, ed. May 19-**92**; iron dump frt., No. R., France *R & Eng* * July -**88**; iron box, B. & O. * Dec -**92**; iron construction, Ettenger *R Gaz* Nov 30 -**88**; Am. steel fire-proof postal * Jan 4-**89**; Schoen pressed steel, inset * May 23-**90**; steel in car construction, Mar 27; Harvey steel box frt. * June 5; pressed steel and malleable iron con., com. report * 12-**91**; construction and design, Barnes * Jan 29; Lamont's steel * Feb 5; Harvey steel construction * 26; iron and steel box, Mex. R. * Aug 5-**92.** See also CARS, tube-frame
LAKE Shore & Mich. So. standard pass. *R Gaz* * Sep 16-**92**
LIGHTING, electric, Leonard *El Eng* July 9-**90,** Bauer, June 8-**92,** Timmis *El Rev Lond* * Sep 11-**91,** do. *El Rev* Jan 11-

Cars, LIGHTING

92, with storage (secondary) batteries, A. Brown *El Wld* * June 1-**89,** Bauer, June 11, Silvey storage battery system * Dec 31-**92,** Sartiaux *Eng* * Oct 25-**89**

E News, systems, cost, ed. and cor. May 25; with storage (secondary) batteries, A. Brown, July 6-**89**; electric, Penn. R., inset * Aug 23, do. Sartiaux, Nov 1-**90**; modern methods and ed. Mar 7, 7, 14, comparative merits, various systems * Apr 18, 25 * May 2-30 * Aug 15, 22, the Pintsch compressed gas system * 29 * Sep 5, 19, 26, oil lamps * Oct 10, 17, electric * Nov 14, 21 * Dec 5, 19-**91,** Mar 12-26, Apr 2, 9, and ed., 16, 16, Bauer, June 9-**92**

Inst C E electric, Sartiaux, abs. v 101 -**90**; Langdon, discuss., inset * v 106 -**91**; *An Telegr* v 17 -**90**

R Gaz electric, Timmis * May 18-**88,** ed., Feb 8, Waite, Mar 1, Frost dry carburetter system, Penn. R. * June 7, elec. light car, Cumb. Val. * 21, elec., Selden, Oct 25, elec. in Am. and Europe, Sartiaux, Nov 29-**89,** by power from the axles, arr., Lond., Brighton & So, Coast R. * Jan 3, Gibbs, * Feb 7, light and heat tender, Chic. Mil. & St. P. (full) * June 13, elec., Leonard, July 11; Frost carburetter tests * 18-**90**; Gibbs elec. (full) Mar 6, (cost, various systems) cor. Aug 28-**91**

LONDON & S. W. works, Eastleigh, England, *Eng* * July 29; bogie composite * Aug 5-**92**

LUBRICATION, Hall *E News* * June 27-**91**; lubricants, English, and testing *R Gaz* * Feb 14-**90**

MEXICAN R. iron and steel box *R Gaz* * Aug 5-**92**

PAINTING, Master Car & Locom. Painter's Assoc. pro. *R Gaz* Sep 20-**89,** Sep 19-**90,** Oct 2-**91**; M'Keon *Sc Am Sup* Oct 1-**92**

PLATFORM, Miller, and coupler patents *R & Eng* * Jan -**88**

PORTABLE partition *E News* * May 30-**91**

PASSENGER, Hoellenthal R., inset *Eng* * Feb 27-**91**; Am. compartment, Wagner Co. *E News* * June 16, special, World's exhib., inset * Nov 17-**92**; Pullman vestibule sleeping *R Gaz* * Nov 23-**88,** Pullman, imps. * Feb 14; Farmer's, with side entrance * Sep 19; Wagner compartment sleeping * Oct 31; Harris sleeping excursion 'Jeannette,' inset * Nov 28-**90**; Bissell 'Gould' platform and vestibule * Mar 18; (various roads) dimensions, Dec 30-**92**; Pullman train in England, ed *The Eng* Dec 14-**88.** See also CARS, under names of R's.

Cars, REFRIGERATOR, Zimmerman aut. *R Gaz* * Jan 20-**88**; the Hanrahan * Oct 30-**91**

REPLACER, Reed's *E News* * Jan 26-**89**; the Norwood * May 17-**90**; Hynes *R Gaz* * Jan 3-**90.** See also BRIDGES, Railroad, guards — rerailers

ROOFS, M. C. B. com. report *R Gaz* * June 22-**88**; Woods, Feb 12-26-**92**

SCHOEN pressed steel, inset *R Gaz* * May 23-**90**

SEAT, Forney's *R & Eng* * June -**89**; the Emmert *R Gaz* * Mar 23-**88**

SERVICE, Wattson *R Gaz* Jan 23-**91**; settlements, ed. Jan 29-**92.** See also RAILROADS, demurrage

SIGNALS, between pass., guards and engine driver, Urquhart, inset *Inst C E* * v 106 -**91**

SILL repairs and general averages *E News* Aug 11-**92**

SLEEPING, discomforts of, ed. *R Gaz* Jan 3-**90**

SOUTH Eastern, England, Am. for, inset *Eng* * Oct 30, 30 inset *E News* * Oct 10; inspection saloon *The Eng* * Aug 14, 21-**91**

SOUTH Mahratta R., 3d class bogie *The Eng* Feb 3-**88**; composite, inset * Mar 20-**91**

STOCK, steel, inset *E News* * July 11-**91**

TRANSFER str. Ann Arbor *R Gaz* * Aug 19-**92**

TRUCKS, electric *El Rev Lond* * July 11-**90**; spring tip, for heavy rock *E News* * Oct 5-**89**; devices for side motion in * Jan 17-**91**; standard frt., Harvey Steel Car Co. * June 16 -**92**; Jewett metal *R Gaz* * June 14; Rich. & Dan. R. * Sep 13-**89**; Fox solid pressed steel pass., inset * June 6; safety chains, ed. Aug 15, fastening, proposed, lateral motion, ed. * 22, ed. * 29, ed. * Sep 5; swing beam and rigid and flange wear of wheels, discuss. 26, Nov 14, ed. Dec 5-**90**; radial, errors in theory, ed. Feb 13; Barber roller bearing * 20; Fox solid pressed steel * Mar 27; radius bars, length, Woods * May 15; 50,000-lb. N. Y. Cen. standard * June 5-**91**

TUBE frame, Jefferds, cor. *Eng* Feb 12-**92.** See also CARS, frt., tube frame

VESTIBULE, Pullman sleeping-car *R Gaz* * Nov 23-**88**; Howard's * Mar 27; Barr's, Chic. Mil. & St. P. * July 17-**91**; and Bissell 'Gould' platform * Mar 18-**92**

WHEELS, and rail sections proper relation, com. report (full) *Am C E* * v 19 -**88**; flat topped rails and cyl., Whittemore, com. final report, insets (very full) * v 21 -**89**; good and bad,

Cars, WHEELS
report *E News* May 19; crushing strength per sq. in., ed. 26 -**88**; worn, mileage of, Penn. R., diagram * Jan 12; and axles, condemning, Penn. R. rules, Mar 9; M. C. B. standards, Aug 3-**89**; discuss. Feb 22; machined, N. Y. Car. W. works, July 12 * 19-**90**; sections, Griffin * June 27-**91**; cracked plates, cause (full) * Oct 13-**92**

Inst C E wear of tires and rails on curves, Helmholtz, abs. v 93 -**88**, *Zeit deut Ing* -**88**

R & Eng steel tired, new method * Feb, foundry plant, Whiting's * May, Griffin grinding machine * Dec -**89**; and axles, Aitken's ap. for rolling, pats. * Sep -**90**; guarantees, Griffin, Sep -**91**

R Gaz axles and track, discuss. Feb 17; Snow, 24, Peckham paper * 24 * Mar 2; steel-tired and chilled, Mass. R. Com's report, May 11; method of comparing cost, June 1; safe (cost etc.), ed. May 25; the contracting chill in wheel making, Barr * Dec 28-**88**; cast iron chilled, and ed. Jan 11; flat-topped rails and cyl. wheels, Whittemore * 25; 33-in. standard * Mar, 8; and rails, form of, report * May 17, June 28; cast iron, specs., M. C. B., report, July 5; contracting and non-contracting chills, discuss. Nov 15-**89**; chilled, form of contract for, Feb 14, Mar 21, Whiting foundry plant * July 11-**90**; best diam., Porcher, Feb 27: imps., Griffin, Mar 6; counter, Schilling's * 20; sections and mechan. conditions, Griffin, June 12; rolling machine, Jones' * Oct 9-**91**; record, Barr, Oct 14-**92**, *J Assoc E Socs*

Sc Am Sup R. Hunt (full) * Aug 2, 9-**90**; best diam., Porcher, Mar 21-**91**; chilled iron and steel-tired, proper method of comparing cost, Swain *Tech Q* May -**88**; Peckham paper *The Eng* * June 7-**89**. See also LOCOMS., driving wheel tires

WINDOW, De Kalb's ventilating *R Gaz* * July 25-**90**

Cartridge machinery *Eng* * Oct 10-**90**

Casting, first made in Am., Woodbury *E News* * Dec 1, *Iron Age* * Dec 8-**92**

Cast iron, aluminum in, Keep, ed. *Eng* Aug 31, 31; influence of al., do., Mabery, Voice *E & Min* * Aug 18, *Sc Am Sup* * Sep 8-**88**; and steel, internat. stresses in, Kalakoutsky *The Eng* June 15-**88**

AMERICAN foundry, notes, Keep *Sc Am Sup* June 16-**88**, *Industries*

Cast iron, ARTISTIC treatment of, Lethaby (full) *Sc Am Sup* * Apr 12-**90.** *J Soc Arts Lond*

MANGANESE in, Keep (full) *Am Min* * v 20 -**92**

MECHANICAL purposes, for, Deny, abs. *Inst C E* v 92 -**88,** *Indus Soc Mul* -**87**

PHOSPHORUS in, Keep *Am Min* * v 18 -**90**

ROLLET process *Eng* * May 16-**90**

SILICON in, Keep (full) *Am Min* * v 17 -**89,** *Eng* * Aug 2, 9, 23, 30-**89**; and sulphur in, Turner, May 18-**88**

STRENGTH, resilience, tests and specs., J. Johnson, discuss. (full), insets *Am C E* * v 10 -**89,** v 22 -**90,** abs. *Inst C E* v 101 -**90,** *Eng* * July 4-**90,** *R Gaz* * Sep 13-**89**; tests, Lanza *Am M E* * v 10-**89,** *Tech Q* Dec -**88.** See also MATERIALS, strength; TESTING

STRESSES, internal, Kalakowtzky *Sc Am Sup* * Feb 18, 25-**88,** *The Eng*

Castle, Henry J. *Inst C E* v 107 -**92**

Castle life in the middle ages, Blashfield *Scribner's* * Jan -**89**

Catalogues, trade *The Eng* Apr 27-**88**

Cattle lairage, Woodside, Birkenhead *Eng* * May 20-**92**; pen and shed, Great No. R. *The Eng* * Oct 28-**92**

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Curve ranger, Trotter's *Sc Am Sup* * Jan 11-**90** * Dec 12-**91,** *Eng, The Eng.* See also INSTRUMENTS; SURVEYING

Curves, the false ellipse, Wurtele *Am C E* * v 24 -**91**; the logarithmic, practical uses, Cox *E News* * Aug 29-**91**; radii of curvature geometrically determined, MacCord (full) *Sc Am Sup* * Jan 5-19 * June 22 * July 13 * Aug 3-**89** * Jan 11 * Oct 18-**90,** geomet. considered * Dec 10-**92,** instruments for drawing * Dec 28-**89** * Mar 29 * July 12 * Sep 20-**90** * Apr 4-**91** * May 14-**92**

Cyclones, whirlwinds *Sc Am Sup* * Aug 11-**88,** *La Nature.* See also STORMS; WIND

Cyclostyle duplicating ap., com. report *F Inst* Apr -**88**

Dady, Jamsetjee N. *Inst C E* v 92 -**88**

Daft, Leo, por. *El Wld* * Mar 30-**89**

Dakota, Black Hills, ore deposits, Carpenter (full) *Am Min* * v 17-**89**

Dams, or high walls to resist the pressure of water, Francis, discuss., insets *Am C E* * v 19-**88**

E News great, of world, inset * Jan 7, 7; high masonry, theory of, Church, report * 14, do., Fteley, Feb 4, 11, det. of profile, Morley * Aug 11, Francis, an error of theory, ed. * Nov 17, earthern, how to build * 17, sluice gates * 24, strains in, Flagg, cor. * Dec 8, curved, Church * 22-**88**; and reservoirs, state supervision of, ed. Aug 24, 24-**89**; earthern vs. masonry, Follett, Jan 2, 9; flow of thick sheets of water over, Herschel * Nov 10-**92**

E Rec hillsides protection, Mahan * Dec 6-**90**; earth and masonry for irrig. works, Follett, May 14, 28; back water from, July 9; design of retaining walls, K. Allen, Nov 12 * 19-**92**

F Inst compound dikes (stone), most econom. cross-section, d'Auria * June -**88**; notable (Irrig. in India), Barois, *R & Eng* * Dec -**92**; masonry, design and construction, Wegmann, bk. *The Eng* Oct 26-**88**; dangerous, Sep 13-**89**. See also CANALS; EARTHWORK; HARBOR eng; HOLLAND dikes; IRRIGATION, India; RIVERS; RESERVOIRS; WATER-works

ATHENS, Ga., Ledlie *E News* * May 5-**88**

AUSTIN, Texas, Col. river *E News* * July 11-**91**; Fanning, report, Frizell * Sep 29-**92**

BEAR Valley, Cal. See DAMS, Sweetwater

BEETALOO water-works, So. Australia, concrete *Eng* * July 3-**91**; Moncrieff *E News* * May 30 * Sep 19-**91**; *R & Eng* * July -**91**; *The Eng* * May 8-**91**

BETHEL, Ct., water-works, and filter bed, proposed *E News* * Mar 7-**91**

BHATGARH *R & Eng* * Aug -**92**

BLACK Eagle Falls, Great Falls, Mont., Parker, discuss., insets *Am C E* * v 27-**92**; *E Rec* * Oct 8-**92**

BOIRE river *E News* * Apr 26-**90**

BUTTE City water-works, concrete masonry *E News* * Dec 15, 22-**92**

CAMBRIDGE water-works, Mass., Stony Brook, Barbour *E Rec* * Jan 5-**89**

CASTLEWOOD, Denver Water Storage Co. *E News* * Mar 22-**90**

Dams, COFFER-dams and floating caissons, R. Hunt *E & Min* * July 19, 26-**90**

CONEMAUGH, Johnstown, Pa. *The Eng* * June 21-**89,** *E Rec*

CROTON water-works, N. Y., Convent ave. gate-house *E News* * Sep 1, 15 **88;** inset * Nov 15, 15-**90;** inset * June 2-**92;** Fteley report *E Rec* * Oct 18-**90.** See also DAMS, Quaker bridge, Sodom

CURVED vs. straight, Bell *E News* Mar 31; strains in, Church, cor. * Dec 1, cor. * 28-**88;** cor. Aug 16; masonry, strains in, Martin, cor. Sep 27-**90**

DAVIS Is. movable, Ohio river, Pitts., Pa. *Sc Am Sup* * Aug 1-**91**

DENVER, Col., Citizen's water Co., large, n *E News* Sep 20-**90.** See also DAMS, Castlewood

ENGLISH, Sierra Co., Cal., destroyed *E News* * July 6-**89**

FOLSOM, Am. river, Cal. *E News* * Oct 17-**91,** *R & Eng* * July **92**

HOLYOKE, Mass., Whiting st. *E News* * Sep 6-**90**

KINGSTON'S floating scouring *Eng* * Oct 26-**88**

KIRK wooden *E News* * Apr 28-**92**

LAWRENCE, Merrimac river, Hale *E Rec* * May 4-**89,** *J Assoc E Soc*

LUMBER, Penn., inset *E News* * Sep 5-**91**

MOVABLE, Pochet's (full) *Sc Am Sup* * May 24-**90,** *Genie Civil.* See also DAMS, Davis Is.

MUSKINGUM river *E Rec* * Mar 8-**90**

NEW Brunswick water works, a dubious Hill, cor. *E News* * June 18 proposed * 28-**88**

NIAGARA [illegible] *E News* * Sep 27-**90**

NORTHAMPTON [illegible] Sold and *E News* * Sep 20-**90**

PAWTUCKET water-works, R. I. *E News* * June 1-**89**

PECOS river, N. M. [illegible] *E News* * May 17-**90.** See also DAMS, reservoir

PICKER, Washington * Nov 26 inset * Dec 8 construction *E Rec* * Dec 8-**92**

PROVIDENCE, R. I., water-works, constructing Chimenden, inset * [illegible] **88**

QUAKER Bridge, Croton aqueduct, N. Y. water-works *E News* * Feb [illegible] Mar 31 report [illegible] inset * Nov [illegible] **88;** [illegible] Oct [illegible] **90;** map *E Rec* * [illegible] *The Eng* Jan 27, [illegible] Nov 30-**88.** See also DAMS, Croton

Dams, RESERVOIR, safety of, Kresnik *E & Min* * Mar 1-**90,** *Inst C E;* rock fill, ed. *E News* July 28, Aug 11, and Schuyler, cor. Sep 22-**88;** and Conn. law, ed. Aug 24-**89;** European, Kresnik, Mar 15; Apr 12; measures for safety of, do. May 10; and embankments for water-works, inset * June 21-**90.** See also RESERVOIRS; WATER-works

SODOM, Croton, N. Y. water-works, n *E News* * Dec 1-**88;** Oct 25-**90;** *Sc Am Sup* * Jan 5-**89**

SOUTH Fork reservoir failure, cause, com. report, discuss. (very full), insets *Am C E* * v 24 -**91;** *Eng* * June 7-**89;** and Johnstown disaster *E News* * June 15-**89;** com. report *E Rec* * Aug 29 * Sep 5-19-**91**

SWEETWATER, San Diego Bay, construction, Schuyler, discuss., insets *Am C E* * v 19 -**88;** and Bear Valley, do. *E News* * Apr 7, F. Brown (Redlands, Cal.) * June 23, Schuyler * Oct 27-**88;** Nov 23, 30-**89;** Schuyler, abs. *Inst C E* v 97-**89**

TANSA, Bombay water-works, inset *Eng* * Apr 29; *E News* * June 30-**92;** *E Rec* * Dec 19-**91**

VYRNWY lake masonry, Liverpool water-works *E News* Dec 29-**88;** and ed. * Aug 18-**92;** *R & Eng* * Jan -**89,** *Industries; The Eng* * June 27-**90**

WALNUT Grove, Ariz., disaster *E & Min* * Mar 1-**90;** *E News* Sep 22 * Oct 20, Nov 3-**88;** * Mar 8-**90**

WATER-works, of U. S., (list) *E News* June 15-**89.** See also RESERVOIRS; WATER-works

WESTPHALIA, Verse river, proposed, inset *The Eng* * Feb 1, 8 -**89**

Daniel, John, por. *E & Min* * Feb 28-**91**

Davenport, Thomas, (inventor elec. motor), Pope, por. *El Eng* Jan 7; some cor. *El Wld* Apr 25; *St R J* * Apr -**91**

Davidson, Robert, por. *El Wld* * June 20-**91**

Davy, Humphrey *Eng* Jan 8-22, Feb 12-**92**

Day, David T., por. *E & Min* * May 23-**91**

Death, Mitchell *Sc Am Sup* Oct 15-**92,** *Nat Sci;* origin of, Gardiner *Tech Q* July -**91**

Dean, John, por. *E & Min* * Dec 20-**90**

Debts, county, of U. S., diagram *E News* * Sep 6-**90**

De Camp, Edward F., por. *E & Min* * Sep 12-**91**

Decorticating machinery *The Eng* * Dec 27-**89**

De Lamar, J. R., por. *E & Min* * Sep 5-**91**

Delta metal, *E News* July 26-**90**

Denham, Henry M. *Inst C E* v 91 -**88**
Denny, Robert *Inst C E* v 95 -**89**
Denny, William (ship builder) bk. n *Eng* Jan 25-**89**
Dentistry, mechanics of, Sweet *Cassier's* Nov -**92**
Deserts, Am. Sahara, 'Valley of Death' *Locom* Jan -**91**; great, of the earth, James (full) *Sc Am Sup* June 22-**89**
Derricks, hydr. and steam, Brown Bros. *Eng* * Apr 18-**90**; stresses in, Elliott * July 10-**91**; hydr. hoist, H. M. S. Vulcan * Nov 18-**92**; derrick plant for Equit. building, Denver, Col. *E News* * Aug 22-**91**; 15-ton. Butter Bros. *The Eng* Mar 2-**88.** See also CRANES
Devonshire, Duke of (W. Cavendish) *Inst C E* v 107 -**92**
Diamond mining and industry, etc., polishing *Eng* * Feb 8-**89**; washing machinery * Apr 25-**90**; Kimberley stats., So. Africa, Sep 4-**91,** report Dec 23-**92,** do., Stonestreet *E Mag* * Aug -**91,** do. *E & Min* Sep 19, discov., Thorburn, Oct 24-**91**; Kimberley indus., Churchill, *Pop Sci* * Aug -**92**; mines, Africa *Sc Am Sup* * Aug 22-**91**; the De Beers mine *The Eng* Aug 17-**88.** See also GEMS
Dibblee, Frederick L. *Inst C E* v 97 -**89**
Dick, Charles *Inst C E* v 94 -**88**
Dickinson, George C. *Am C E* v 26 -**92**
Dictionary. See CENTURY dictionary
Diet, proper, for hot weather, Davies *Pop Sci* July -**92**
Dikes, Holland, notes, Starling, discuss., map, insets (very full) *Am C E* * v 26-**92,** do. *R Gaz* Nov 11-**92**; compound (stone), most economical cross-section of, d'Auria *F Inst* * June -**88.** See also CANALS; DAMS; RESERVOIRS; RIVERS, etc.
Dirks, Justus *Inst C E* v 92 -**88**
Disasters, in Aug., ed. *E News* Sep 8-**88**; great, earthquakes, floods, etc., ed. July 6-**89.** See also BRIDGE accidents; BOILER explosions; FLOODS; STEAMERS; RAILROADS, accidents, etc.
Discoveries, great, of past sixty years *Locom* Sep-Nov -**89**
Disinfecting ap., Koch, abs. *Inst C E* v 96 -**89,** * *Bul Soc Mul* -**88**; *Sc Am Sup* * June 30-**88,** *The Eng*
Disintegrator, the devil *Eng* * Aug 10-**88**; trials *The Eng* * June 27-**90.** See also CRUSHING, GRINDING
Disk, hollow cast iron, strains in, Leverich *Am C E* * v 18-**88**
Dividing engine, 40,000 lines to the inch, Rowland *E News* Feb 18-**88**

Diving boats *Eng* Mar 15, Apr 5-**89**; Stove's diving dress * Mar 28-**90**

Dixon, John *Eng* Feb 6-**91,** *Inst C E* v 104 -**91**

Docks, Auckland, N. Z., calliope graving, Swainson *Inst C E* v 101 -**90**

BARRY, works, J. Robinson *Eng* Apr 11-**90,** hydr. machinery and mode of tipping coal, discuss., insets *Inst C E* * v 101 -**90**

BOMBAY graving, proposed *Eng* * May 18-**88**

BRISTOL *The Eng* * Oct 14-**92**

BROADSIDE dock slip, for ships *Sc Am Sup* * Aug 8-**91**

BROOKLYN Navy Yard dry-dock, Simpson *Eng* * Aug 22, *R & Eng* June -**90**

CARDIFF schemes, Bute dock, map *The Eng* * Dec 9-**92**

CHATHAM *The Eng* * July 24-**91**

CUBA, crib for Signa Iron Co. *E News* * Apr 9-**92**

DRY-docks, of world *R & Eng* Aug -**89**; Wivenhoe *The Eng* * Feb 21-**90.** See also DOCKS, names of places

ESQUIMALT, Brit. Columbia, inset *Eng* * July 20, inset * 27-**88**

FLOATING, and pontoon, Taylor *Eng* * Aug 10, do. *Sc Am Sup* * July 7-**88**; offshore, Hamburg * May 10-**89,** do. *The Eng* * Mar 11-**92**; Limerick, steel gates, Hall *E Rec* Apr 10-**90,** do. *Inst C E* v 97 -**89**

GLASGOW harbor *Eng* * Aug 9-**89**; the Cessnock *E News* June 2-**92**

GRAVING *Eng* Nov 18-**92,** *Inst C E.* See also DOCKS, names of places

HALIFAX, Nova Scotia, graving *The Eng* * Feb 28-**90**

HAMBURG floating offshore *Eng* * May 10-**89,** *The Eng* * Mar 11-**92**

HAVRE port dry-dock *E Rec* * Dec 3-**87,** * *Genie Civil;* Bellot dock, Desprez, abs. *Inst C E* v 101 -**90,** *An Ponts* * v 17-**89**

HULL, Alexandra, Hurtzig *Eng* Feb 10, discuss., inset *Inst C E* * v 92 -**88**

INDIA, East & West, arbitration *Eng* Dec 28-**88**

LEAGUE Island dry-dock *E News* * Mar 14-**91**

LIMERICK, floating, gates, Hall *E Rec* Apr 10-**90,** *Inst C E* v 97 -**89**; failure of walls and methods for reconstruction, Hall, inset * 103-**91**

LIVERPOOL, port and Mersey river, dredging *Eng* * May 30 * June 6; Lyster, Jan 17, extensions, discuss., insets (very full) *Inst C E* * v 100 -**90**; Mersey estate *Inst M E* July -**91**

Docks, MARE Island, Cal., dry-dock *E Rec* * Feb 13-**92**
MARQUETTE, Mich., ore dock, Duluth, So. Shore & Atlan. R. *E & Min* * Jan 10-24-**91**
NEW York dock walls *E Rec* * Sep 3, Oct 1-**92**
PORTSMOUTH dockyard *Eng* July 29 * Aug 5, 5, lifting ap., Corner, 26-**92**
PRESTON scheme, ed. *The Eng* June 29-**88**
PUGET Sound, Wash., U. S. Naval station, inset *E News* May 19-**92**
SAN Francisco dry-dock, hydr., Union Iron works *R Gaz* * Nov 27-**91**
SOUTHAMPTON tidal *Eng* * Sep 12, inset *The Eng* * July 25 -**90**
Domestic motive power by atmos. exhaustion, Dollfus, abs. *Inst C E* v 93 -**88,** *Bul Soc Mul* -**88**; motors worked by rarefied air, Bourdenoot, abs. v 96-**89,** *Compt r* Feb 1-**89**
Dolivo-Dobrowolsky, Michael Von, por. *El Wld* * Mar 19-**92**
Dom Pedro, ex-Emperor of Brazil *Inst C E* v 108 -**92**
Douglass, Archibald Bryce - *The Eng* Apr 10-**91**
Dovetails, holding power of, Poe, report *E News* * Dec 20-**90**
Downes, Charles C. *Inst C E* v 92-**88**
Downing, Samuel F. *Inst C E* v 109 -**92**
Drainage, tables, G. Johnson *E News* May 5, 12-**88**; blunders, Webster *E Rec* * Dec 10, 24-**92**; hints, Chandler *Tech Q* Dec -**88.** See also SEWERAGE
CHARLESTON, S. C., tidal *E News* Oct 25-**90**
CHICAGO, drainage canal *E News* * June 2, 30-**92**; *E Rec* May 23-**91**
FENS and lowlands, by gravitation and steam power, Wheeler, bk., Spon, Lond. -**88**
HOUSE, domestic and water supply, Hartford *E Rec* * Apr 2, 16-**92**; Chandler *Sc Am Sup* Jan 26-**89,** *Tech Q*
LOUGH Erne, Price, discuss., inset (full) *Inst C E* * v 101 -**90**
KANKAKEE marsh, Chic. canal *E News* * Nov 3, 3-**92**
MEXICO, Valley of, Chism, map *E & Min* * Dec 8, 15, 22-**88,** map *E News* * Aug 10-**89**; City of Mex., hist. sketch, Noll *E Rec* Mar 16-**89**; Val. *Sc Am Sup* * Aug 10, map *The Eng* * June 28-**89**
WIESBADEN-Essen-Halle, abs. *Inst C E* v 96 -**89,** *Deut Vier Ges* -**89**
Draw-bridges. See BRIDGES, draw-bridges

Drawing, section lining, standard, Van Vleck *Am M E* * v 9-**88**; Holman *Cassier's* * Sep -**92**; drawing-board, vertical *Eng* * Jan 13, do. Vorth's *E News* Apr 7-**88**; section-liner and scale divider, Both's * Oct 12-**89**; T square, Deane's adjustable * Sep 13-**90**; essentials of mechanical drawing, Forney (very full) *R & Eng* * Mar – * Dec -**90** * Jan – * Dec -**91** * Jan -**92**; as a means of education, Ablett *Sc Am Sup* July 7-**88**; simple method (artistic), Jacquot * Mar 29-**90.** See also INSTRUMENTS, curve rule

Dredge, James, Wiley, por. *Cassier's* * Feb -**92**

Dredgers and excavators, Panama canal, Williams, insets *Am C E* * v 19-**88**; steam excavs., Clements *Am M E* v 9 -**88**; Bennett elec. and amalgamator *El Rev* * May 23-**91**

Eng double-ladder, Swansea harbor, inset * July 13; frictional gear for, Griffith * Aug 24; 'Kuphus' hopper, Bombay Port, inset * Dec 7-**88**; hopper suction 'Libana,' Port of Libau, inset * Jan 11; shore delivery for lake Copais * Feb 1; dredging cost, Apr 26-**89**; sand pumping, Mersey bar, ed. Apr 11, and docks * May 30 * June 6; Cockburn crane and grab * Oct 3-**90**; for excav. gold-bearing river beds * Jan 9; steam crane excav., Weser river imp. works * 16; dredging and amalgam. plant, inset * Mar 27; Manchester canal soil transporter, inset * July 24-**91**; floating elevator, transformation * Aug 19; Jupiter twin screw suction pump * Sep 30-**92**

E News Panama canal plant * Aug 18, 25; French suction, Vernandon * Nov 10-**88**; English, cost of, May 11; Lobnitz rock * Jan 26, work of * Oct 19-**89**; German stone * Aug 16-**90**; Man. canal soil transporter, Sep 5-**91**; ap. for N. Y. harbor, Edwards, inset * Mar 19; the Booth pump * 26; trestle filling, N. Or. & N. E. R. * Aug 4; dredging on Pac. coast, Miller, 4 * 11-**92**; Lobnitz rock, removal under water without explosives *E Rec* * Oct 12-**89**; four-screw hopper, Walker * Feb 13-**92**, do. inset *Inst C E* * v 107 -**92**; the von Schmidt, Higgins, inset * v 104-**91**; hydr., N. Y. harbor *R Gaz* Aug 28-**91**; Jandin's hydro-pneu, jointed conduit *Sc Am Sup* * Mar 9-**89**

The Eng dredging machinery, subaqueous rock, Suez canal, Mar 9; combined traction engine, crane and excav. 30; hopper, Glasgow exhib. Sep 7, 7-**88**; Wilson's single chain grab * Nov 28-**90**; hopper, for New So. Wales, inset * Apr 8; sand pump, Thyboron, inset * Sep 16-**92.** See also under CANALS; HARBOR eng.

Drexel Institute, Phila., Depew *E Mag* Feb -**92**

Drifting tests, autographic, Goodman *Inst C E* * v 92-**88**

Drills and drilling, electric mining *El Wld* * Dec 12; Simplex twist-drill grinder *Eng* * Nov 6-**91**; Ingersoll-Sergeant, air valve *E News* * Sep 27-**90**; Ainly-Oakes square hole drilling machinery, inset * June 20, inset * 27; Edison elec. percussion, May 16-**91** * Aug 25; Schuttler contin. acting ratchet * Oct 6-**92**; rock, trials, Carbutt, insets (full) *Inst M E* * Mar; Hawksworth stay-bolt *R Gaz* * May 29-**91**; Edmeston grinding machinery *The Eng* Apr 27-**88**. See also ROCK drills

Driven wells. See WELLS

Dry-docks. See DOCKS, dry-docks, etc.

Drying ap. in vacuo, Passburg *Eng* * June 28-**89**, insets *Inst M E* * May -**89**, *Sc Am Sup* * Apr 19-**90**

Dublin, port and works, Griffith, insets *Inst M E* * July -**88**

Duluth, Minn., sts., pavements, sewers and drainage *E News* * Feb 14-**91**

Duncan, Louis, por. *El Wld* * Apr 5-**90**

Duncan, Robert *The Eng* July 12-**89**

Duncan, Thomas *Inst C E* v 110-**92**

Du Port (Bey), William J. *Inst C E* v 106-**91**

Duodecimals, Halliday *The Eng* Mar 1-**89**

Dust, (means of excluding) and fresh air, Teale *Pop Sci* June -**92**; number of particles in atmos., Aitken *Sc Am Sup* Apr 7 -**88**; atmospheric, Marcet, June 21-**90**; spectroscopic properties, Liveing * Feb 14-**91**; McPherson, Jan 2-**92**; Prinz dust collector *The Eng* May 11-**88**

Dye-houses, ventilation of *Locom* Dec -**88**

Dyes and dyeing, a revolution in dyeing, Chase *F Inst* Nov, Dec -**90**; and photographic printing, diarotype proc., Carbutt, June -**91**; dyes, coal-tar or aniline *Chem Tr J*, *Sc Am Sup* May 9, fast and fugitive, Hummel (full) July 11, 18-**91**, Jan 30 -**92**, *Soc Arts Lond*; lactic acid and lactates in textile coloring, Norton *Tech Q* Nov -**90**. See also CHEMISTRY; COLORS; INDIGO, etc.

Dyewood extracts, notes, Siebold *Sc Am Sup* Aug 17-**89**

Dynamics, a question of, Dewey, ed. *E News* * June 23-**88**; dynamic possibilities, ed. Sep 15-**92**; practical illustrations of, Greenhill *The Eng* Sep 13, 27 * Oct 25 * Nov 8, 22, Dec 6, 20, 27-**89**, problems in, Jan 31, solution, Apr 4; nomenclature com., Brit. Assoc. pro. Aug 15, 22-**90**; of gravity, Preston, cor.

Dynamics

Apr 10-**91.** See also PHYSICS, Dynamics, bk., Fessenden, Lond. -**92**

Dynamite shells, ed. *Eng* Nov 16-**88.** See also EXPLOSIVES; GUNNERY and armor

Dynamometers, transmitting, loss in by friction, S. Webber *Am M E* * v 10-**89**; aut. absorption, Alden * v 11 -**90**; belt dyn., Watt v 12 -**91**; measurement of power, Gray, variable speed power transmission, Spaulding * v 13, 13 -**92,** *Iron Age* * Dec 8-**92**

Cassier's power measurement, Gray * June -**92**; Alteneck *El Eng* * May -**88**; *El Rev Lond* * Sep 23-**92**; the Trouvé *El Wld* * July 19-**90**; Heinrich * June 11-**92**

Eng friction brake, Beaumont, Nov 16-**88,** do. Brotherhood registering * June 14-**89**; Amsler's recording * Oct 24-**90**; a belt, Watt * Sep 18-**91**

E News aut. absorption, Alden * June 28-**90**; belt dyn., Watt * June 20-**91**; measurement of power, Gray * May 19-**92**; rough and ready, for small motors, Hoskin *F Inst* June **91**; friction brake, Beaumont, discuss. (full) *Inst C E* * v 95-**89**; aut. registering *Sc Am Sup* * Feb 9-**89,** * *Industries*

The Eng Deprez registering, Feb 17; Smith's rotary transmission, May 11; friction brake, Newcastle engine trials, Anderson, Nov 9-**88**; Murray power transmission * Nov 29-**89**

Dynamos, Dynamo-Machinery, S. P. Thompson, bk., Spon, Lond. '88

El Eng machines, theory, Hopkinson * Jan, diseases, S. P. Thompson, Jan -**88**; shunt wound, influence of position of commutation on output of, Martin * Dec 31-**90**; design, Reid * Feb 4, 11-**91**; management, Crocker, Wheeler * Jan 13, 20 * Feb 3-17 * Mar 9, 16, 30, Apr 27 * May 11, 18; design, Loomis, Mar 16; machinery, theoret. elements, Kennelly * Apr 20, 27 * May 4, 18, 25, June 15, Nov 30, Hopkinson * May 11; genesis, Pacinotti, por. * Sep 21, 28 * Oct 5, 12-**92**

El Rev Lond machines, synthetic study (full) * Aug 3, 10, 24, Sep 7, 21 * Oct 5, 19 * Nov 2, 16, 23 * Dec 7, 21-**88** * Jan 11, 25, Feb 15 * Mar 1, 15 * Apr 5, 19 * July 5, 19 * Sep 6 * Oct 4-**89** * Jan 31 * Feb 14 * Apr 4, May 2, 16, June 6 * July 11, Aug 22, Sep 26, Nov 7, Dec 26-**90**; Paris exhib. * July 12, 26 * Aug 2, 9, 23 * Sep 6, 13 * Oct 11-**89**; machines, Minet, Feb 7, 14; and motor design, Esson * 28 * Mar 7, 14-**90**; Blackburn

Dynamos

* Jan 30 * Feb 6; choice of a dynamo, considerations. Roberts. Oct 30, Nov 6; Frankfort exhib. * Oct * Nov * Dec -**91**; machinery, Hopkinson * Apr 15; waste field of. expts. Puffer * 15; relative weights and costs. Snell * May 20: cals. and designing chart, do. * June 3-**92**

El Rev Knowles * July 20-**89**; machines and motors imps. Swinburne * Apr 19; control of and coupling. do. Sep 6, 13-**90**, *Industries*

El Wld and motors, cal. and designing. Crocker * Apr 28: machines construction, Poole, June 30; and motors designing. Owens * Nov 17 **88**; machines, Hillairet. Sep 7-**89**; and motor design, Esson (full) * Mar 22, 29 * Apr 5, 12: best speed. Rechniewski * Sep 13, new forms, Wadsworth * 13-**90**; choice of a dynamo, Roberts, Oct 17-**91**; and motors. magnetic leakage, Ives (full) * Jan 2; effic. determinations, Kapp * Feb 20: dynamo elec. machinery, Hopkinson, Wilson * Apr 30: relative costs and wts., Hering * 30; and motor cal., Bedell. diag. * 30: heat radiation from, Rechniewski, May 14; relative wts. and cost, Snell * June 25; effic. diag., Hering * Aug 13: designing. Picou, Nov 5 **92**

Engg Paris exhib. * Sep 6; Desrosier, do. * Oct 18-**89**; early * July 10 **91**; and motor cal., Bedell, inset *F Inst* * June -**92**; 1000 h p steam, Berlin Cen. elec. light station, Uppenborn, abs. *Inst C E* v 100 **90**, *Elek Zeit* v 5 -**90**; Cail Soc. abs. *Inst C E* v 100 **91**, * *Genie Civil* v 19 -**91**; designing. Hobart *Elec* * Oct * Nov **89** * Feb - * Apr * June - * Sep -**90** * Feb, Mar **91**; development. Fairchild * Apr * May -**90**; losses in, Hobart * May **91**; diseases of, S. P. Thompson *Sc Am Sup* Jan 7 **88**; waste field of, experimental study, Puffer *Lond E* * Oct **91**; speculations on electro-magnetism, Fritsche *Ins Engg* * June 21; Alioth, Paris exhib. July 12-**89**. See also ELECTRIC generators motors

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investigation (full) *El Rev* * Nov 8, do. *El Wld* * Nov 8-**90**; Kennedy *El Rev Lond* * June 1-15, 29-**88**; * May 17-**89**; curves showing performance, Lewis *El Wld* * Nov 14-**91**; machinery, Kapp *Eng* Feb 22, May 31-**89**, do. and discuss. (full) *Inst C E* * v 97-**89**; generators and receivers, Anthony *Soc Arts Mass* -**88**

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EDISON, and motor *El Rev Lond* * Aug 21-**91**; *Sc Am Sup* * Mar 5-**92**; Paris exhib. *The Eng** Nov 15-**89**

EICKEMEYER'S *El Eng** Mar -**88**

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FRITSCHE wheel *El Rev* * Apr 6, n *Sc Am Sup* * Apr 20-**89**

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HOCHHAUSEN arc light machine *El Eng* * Apr 23-**90**

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LEEDS, the *The Eng* May 25-**88**

MORDEY alt. current *Eng* * June 1-**88**

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El Wld max. effic., Howell * Apr 14, 28; (wiring) leads, table, July 14-**88**; relation between initial and av. effic., Peirce (full) * June 8; fits. from and effic., Reed * Nov 30, shape and size do. discuss., Dec 14-**89**; Berrenberg's vac. pump * Apr 26; life of, table, May 3; Edison special, Jackson, Sep 27-**90**; highest econ., Leonard, Apr 18; Grier, 25-**91**; Ries' regulating socket * Mar 19; curves and wire cals. without tables, Roberts * July 2; life and effic. test, Thomas (full) * 16, do. Gossler (full) * Sep 17; age-coating in, Nichols * Nov 12; pats., separable or detachable, Böhm * Dec 3; advantages of forcing at expiration of their life, Hering * 24; life and effic. tests, Feldmann * 17-**92**, *Electric Lond*

Eng glow lamp pats., ed. July 20-**88**; deterioration of, ed. Jan 23-**91**; glow lamps, max. effic. Howell, abs. *Inst C E* v 93 -**88**, *El Eng;* and arc, probs. in the physics of, Fleming *Sc Am Sup* * Aug 23-**90**; data and testing, Puffer (full) *Tech Q* * Feb, insets * May -**90**; candle power relative to voltage, Ferguson, insets * July -**91**

PORTABLE, Friedlander's *The Eng* June 1-**88**

LAUNCHES, Reckenzaun (full) *El Eng* Aug 13-**90**; on the Thames river, Forbes *El Wld* Oct 5-**89**; *E News* Aug 23-**90**. See also LAUNCHES

LIGHT, car, Penn. R., inset *E News* * Aug 23-**90**; and power long dist. transmission, Scott *El Eng* * June 15; lights, photometric study of, Genung *El Rev Lond* * Dec 16 *El Wld* * May 28-**92**; signals, Conz incand. system *The Eng* July 6-**88**. See also ELEC. Lighting

LIGHTING, from financial standpoint, Wiman *Cassier's* Apr -**92**; dangers, Edison *El Eng* Dec -**89**, Jan -**90**; in railroad service, Leonard, July 9, do. *E News* July 12-**90**

El Rev Lond Fontaine, Sep 27-**89**; standard specs. July 4; sanitary aspects, Preece, Aug 29; in its relation to the consumer, Naylor, Dec 5-**90**; mains, Preece, May 22; nine years' record, Bd. of Trade report, Aug 14-**91**; English stats., table, Jan 8; figures, Booth * Apr 1, 8, 22 * May 27, June 17 -**92**

El Rev convention, Pitts. (full) Feb 25-**88**; hazards, Has

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kins, Oct 5-**89**; in the tropics, Fleming, May 31; superior to gas, Hoho, Oct 25-**90**; cost, table, com. rep. Feb 28-**91**

El Wld by storage bats., cost, Oct 18-**90**; data, com. rep., table, Feb 28; prices, July 4; relation to optical science, Boyle (full) * Nov 14-**91**; from finan. standpoint, Wiman, Mar 5; supply cost, Hopkinson, Dec 3, 10, 24; photometric study of, Genung * May 28, do. *El Rev Lond* * Dec 16-**92**

Eng central station, Crompton (cost, etc.) Apr 20-**88**; cost, ed. Nov 11-**92**; artesian well plant *E News* * Sep 29-**88**; cost of, various cities, n Oct 5, 12-**89**, Jan 25; Kansas City, June 28; candle power, Kingman, cor. 28-**90**; Geipel *Inst M E* Feb -**88**; and working, Preece *Sc Am Sup* June 2, 23; in Am., Forbes (full) Oct 27-**88**; Fontaine report, Nov 16-**89**; cost *The Eng* Mar 11-**92**

ACCESSORIES, English and Am. differences, Bathurst *El Wld* July 26-**90**

ANNAPOLIS, Md. station *El Wld* * July 27-**89**

APPARATUS, rules for *E Rec* Aug 16-**90**

ARC, Westinghouse alt. system *El Eng* * Apr 2; cost, various towns and cities, Rosewater, 9-**90**; use of arc in, E. Thomson (full) * Feb 25; rates, various cities, Apr 1-**91**, cost do. *El Rev Lond* Dec 13-**89**; E. Thomson, Mar 20 * 27, Apr 3 -**91**; cost from small power stations, Sep 30-**92**; cost various (38) Am. cities, table *El Rev* Mar 26-**92**; the Huntington arc projector *El Wld* * Dec 7-**89**; station, St. Louis (largest in world) report (full) Jan 3; use of arc in, E. Thomson (full) * Feb 28; 'Munic.' St. Louis system, Ayer, Sep 19-**91**; Westinghouse system, abs. *Inst C E* v 101 -**90** * *El Eng N. Y.* -**90**; cost, various cities *Sc Am Sup* Dec 14-**89**

ASHTON Court station, England *The Eng* * Dec 11, 11-**91**

ASSOC., Nat. pro. (full) *El Eng* Sep -**88**, Sep -**89**, (full) Mar, Mar, Aug 27-**90**, Feb 25, Montreal (full) Sep 16-**91**, Huntley addr. Mar 2-**92**, (full) *El Rev* Sep 8-**88**, (full) Mar 2, Niag. Falls, Aug 17-**89**, (full) Feb 22, Aug 30-**90**, (very full) Feb 28, Montreal, pors. * Sep 5, 19-**91**, pors. * Feb 20, (full) Mar 5-**92**, (full) *El Wld* Mar 3, Sep 8-**88**, (full) Mar 2, Aug 17-**89**, Kansas C. (very full) Feb 22, pors. * Aug 30-**90**, Pres. addr. (full) Feb 28, Montreal (very full) Sep 5-19-**91**, general hist. review, pors. (full) * Feb 27, Mar 5-**92**, *Sci Am* Mar 9-**89**, Prov. *St R J* Mar -**91**

Electric LIGHTING, BALL system *Sci Am* Feb 9-**89**
BANGOR, Me., Brush munic. plant *El Wld* June 29-**89**
BERLIN *El Rev Lond* July 19, 26-**89**; Kaiser gallerie *The Eng* Sep 21-**88**
BOSTON, Edison station (full) *El Eng* * Aug 10-**92**
BRADFORD, map *El Rev Lond* * June 10-**92**
BRIGHTON, Crompton report *El Rev Lond* Mar 7-**90**
BROOKLINE Gas Light Co., Mass., station *El Eng* * Mar 16-**92**
BROOKLYN, N. Y., Edison station, development, Field *El Eng* * Mar, *El Rev* * Mar 1, *El Wld* * Feb 22-**90**, (full) * Dec 21-**89**
BRUSH-Swan station effic. test, Bedell *El Wld* Sep 10-**92**
BUOYS, N. Y. harbor (cables) *El Rev* * Mar 12-**92**
CAMBRIDGE, England, station (full) *Eng* * Nov 4-**92**
CANCE system *Eng* July 19-**89**
CHELSEA, England, distrib. with accums., Webber (full) *El Rev Lond* * Oct 4-**89**
CHICAGO, Ill., Wash. Park, Scheffler *El Eng* * Nov 30-**92**; *Eng* * June 19-**91**
CINCINNATI, O., Hickenlooper station (working plan and el.) *El Wld* * Aug 24-**89**
CLINTON, Mass. station *El Eng* * May 20-**91**
CONDENSERS, future of, Swinburne *El Eng* * Jan 6; spark and air jet expts., E. Thomson * Feb 24-**92**. See also ELEC. condensers
DEPTFORD, Ferranti mains *El Eng* * July 9-**90**; alt. system *El Wld* * Dec 8-**88**
DOMESTIC, O'Keenan primary applic. to, Shedlock *El Wld* * July 7-**88**; plant test, Segundo, July 12-**90**, *Industries*. See also ELEC. Lamps, incand. — lighting, incand.
DUBLIN station *El Rev Lond* * Sep 16-**92**; *The Eng* Oct 2 -**91**
EASTON system *El Wld* * Nov 30-**89**
EDISON, pat. suit in England (full) *El Eng* June- Sep -**88**; station test, Hill (full) *El Rev Lond* Dec 21, 28-**88**; and Swan United Co. report, Aug 2-**89**, Aug 1-**90**, July 22; feeder and main pat. hearing, Aug 5-**92**; Edison Illum. Co's pro. *El Rev* Aug 24, *El Wld* Aug 24; Canada decis. (full) Mar 23-**89**; and Swan pats., legal decis. *The Eng* Dec 21-**88**; three-wire central station system * Nov 15, 22-**89**. See also ELEC. Co's, Edison; ELEC. lamps, incand, etc.

Electric LIGHTING, EIFFEL tower plant *Eng* * June 21, (full) *Sc Am Sup* * July 27-**89**

EMS, Imhoff, abs. *Inst C E* v 92 -**88**, *Central Elek* -**87**

ENGINES, high and low speed, Powers *El Eng* * July -**88**; Edison direct connected trip-expan. and generator * Apr 29-**91**; high speed in, Thurston *El Rev Lond* Aug 29, *El Wld* Aug 9-**90**; independent engines for incand. stations, Church * Mar 3, *El Rev* Feb 25-**88**; 1000 h.p., Berlin, inset *The Eng* * Apr 11, 11-**90**. See also ELEC. light stations; ENGINES

FERRANTI system, Haskins *El Eng* Feb 25, *El Wld* Feb 28 -**91**

FRANKFORT-on-Main *El Rev Lond* Feb 28 * Mar 7-21-**90**; exhib. May 29-**91**; report, abs. *Inst C E* v 100 -**90**, *Elek Zeit* v 5 -**90**; station, Miller report *The Eng* * Sep 30-**92**

GENEVA, Chavannes, abs. *Inst C E* v 95 -**89**, *Lum Elec* v 29 -**88**

HANOVER, Kohlrausch, report, abs. *Inst C E* v 100 -**90**, *Elek Zeit* v 5 -**90**

INCANDESCENT stations, independent engines for, Church *El Rev Lond* * Apr 13-**88**; prog. Böhm * Oct 9, 16, (full) *El Wld* * Sep 12-**91**; Ottawa, Ill. Valley plant, long dist., map *E News* * Oct 5-**89**; carbon filaments, Fitz-Gerald, n *The Eng* May 18-**88**; Adelphi theatre plant, Edison-Swan Co. * Jan 25-**89**. See also ELEC. lighting, London, etc. — stations

KESWICK water-power station, Fawcus *Eng* May 30, and discuss., inset *Inst C E* * v 102 -**90**

LIVERPOOL stations *El Rev Lond* Jan 30-**91**; license *E Rec* Sep 22, Oct 13, 27-**88**

LONDON *El Rev Lond* May, June 14, schemes, July, Aug -**89**; prog., Bailey (full) Dec 19-**90**; Elec. Supply Corp. report, Apr 1-**92**; prog., Bailey *El Wld* Jan 10-**91**; ed. *Eng* May 24-**89**; Pruden. Assur. Co. offices station * Feb 14-**90**; Naval exhib. * Nov 27 * Dec 11-25-**91** * Jan 1, 8-**92**; Lond. Supply Corp., Deptford *E & Min* Nov 10-**88**; *E News* July 4-**91**; Lond. Cen. station, Gilley *Soc Arts Mass* -**90**

The Eng Deptford incand. station, Lond. Elec. Supply Co. Oct 26-**88** * Apr 5, 12 * May 31; Kensington incand. station, House to House Elec. Sup. Co. * Feb 8-**89**; * Sep 5, 12 * Oct 24 * Nov 7 * Dec 5, 12, 26-**90**; Met. Sup. Co., map * Jan 16, 16 * 23 * Mar 6, Scotland Yard * May 8-**91**; St.

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Pancras station, Regent's Park * Feb 19, 26; Notting Hill * Apr 15; Westminster Sup. Co. * May 13; * Sep 9-**92**
LOOMIS system *E News* * May 18-**89**
LOWELL light and power station, Shaw *El Eng* * Jan 14-**91**
MASSACHUSETTS statistics *El Wld* Mar 26-**92**
MELBOURNE exhibition, Murray *El Rev Lond* Nov 15-**89**
MOLDINGS, inset *El Eng* * Sep 10-**90**
MOTORS, trials *El Rev Lond* Feb 22, report *Eng* * Feb 22 * Mar 1-15, *F Inst* May -**89**, *J Soc Arts*
MUNICIPAL, Francisco *El Rev* Aug 30, *El Wld* Aug 30-**90**; Bangor, Me., plant, Brush, June 29-**89**; St. Louis 'Munic.' arc system, Ayer (full) Sep 19; by munic. authorities, H. Robinson *E News* Sep 12-**91**
NATICK, Mass., station *El Eng* * Aug 6-**90**
NEWCASTLE-on-Tyne Elec. Sup. Co. station, Heaviside *El Rev Lond* Oct 28-**92**
NEW York City, Edison 26th st. station, (full) *El Wld* * Jan 19-**89**; Madison Sq. Garden, Sullivan * Nov 14-**91**; * Jan 2-**92**
OXFORD station (full) *El Rev Lond* *July 8, *The Eng* *July 1-**92**
PARIS, exhib. '89 *El Rev Lond* Mar 29-**89**, Mar 21, 28, Apr 4, May 16, 23, 30-**90**; Sector of Place Clichy works * May * June 5-**91**; exhib., Heister system *El Wld* * Aug 24-**89**
Eng Palais Royal Edison station * Mar 8; exhib. * May 3, portable military plant, July 19, Oerlikon plant, 26, * Nov 15, 22-**89**
Inst C E Paris markets, Andra, abs. v 100 -**90**, *Genie Civil* * v 16 -**89**; station, Meyer, abs. *Inst C E* v 105 -**91**, *An Ponts* v 12 -**90**; Nansouty, abs. *Inst C E* v 108 -**92**, *Genie Civil* * v 20 -**91**; exhib., Fontaine *Sc Am Sup* * May 25 * Aug 17, Gramme station * Oct 19-**89**; Boul. Rich works, Lenoir * Jan 2-**92**
The Eng Paris exhib. * May 3-31 Oerlikon works * June 14, 21, T-H system * 28, station, July 26, Soc. Gramme do. Sep 20-**89**
PHILADELPHIA, Edison station *El Eng* * Oct 8-**90**, *Pwr* * May -**89**
PORTABLE plant *Eng* * Feb 10-**88**; light port. military, Paris exhib. July 19-**89**, do. Charlesworth *Sci Am* Nov 17-**88**, do. ap., Suez canal *The Eng* Oct 12-**88**

Electric LIGHTING, PROVIDENCE, R. I., Narragansett Co. station *El Eng* * Sep, (full) *El Rev* sup. * Aug 17, Henthorn (full) *El Wld* * Aug 17, *Pwr* * Oct -**89**, *St R J* * Aug -**90**

REGULATIONS, light and power service rules, Columbian exhib. *El Eng* Dec 28-**92**; station, safety *El Rev Lond* Jan 11-**89**; acts 1882 and 1888, Jan 10; (full) Oct 17-**90**; rules for work, Benjamin *El Rev* May 10; and motive power, for install. of, Boston Manuf'rs Mut. Ins. Co. Aug 23, do. *E News* Aug 9; ins. rules, com. report *El Rev* Aug 30, Sep 27, Jenks, 27, N. E. Ins. Exchange, Nov 8-**90**, do. *El Wld* Apr 21-**88**; rules, com. report, Sep 19-**91**; rules, for safe install. *E News* Aug 9-**90**, Oct 3-**91**; rules for *E Rec* Aug 16-**90**. See also ELEC. insurance regs.

ROPE gear for elec. light work, Booth, Lea *El Rev Lond* June 26-**91**

RULES. See ELECTRIC lighting regulations

SAFETY devices E. Thomson *El Eng* Mar, *El Wld* Feb 22-**90**; station safety regs. *El Rev Lond* Jan 11-**89**. See also ELEC. lighting regs.

ST. Brieux *El Wld* * May 16-**91**, *El Rev Lond*

ST. Catherine's Point light-house, most powerful light in world *Sc Am Sup* * July 21-**88**, *The Eng*

ST. Louis 'Munic.' arc system and station (largest in world) *El Rev Lond* Jan 16, report (full) *El Wld* Jan 3, Ayer (full) Sep 19-**91**

ST. Paul Gas Co. station *El Wld* * Feb 23-**89**

SALEM, Mass., T-H station *El Rev* * June 15, (plans) *El Wld* * June 15-**89** * Mar 15-**90** * Feb 14-**91**

SOPHIA City *El Rev Lond* June 17-**92**

SPERRY system *El Wld* * June 15-**89**

SPOKANE Falls station *El Wld* * Sep 13-**90**

STATIONS *Am C E* Edison incand., test of, Hill, and discuss. v 18 -**88**; *Cassier's* speed reg. of engines, Aldrich, May -**92** *El Eng* incand., independent engines for, Church, Mar -**88**; stats., U. S. Aug 20; value of detail in, DeCamp * 27-**90**; distrib. of steam from, Prentiss * Feb 25; central, management and finance, Foster, Apr 22, 29, May 6-20, June 3-24, July; op. by water power, Redman, Sep 16-**91**; fly-wheel accidents, Emery, Feb 10, 17; effic. and higher econ., Vail, Nov 23, 30, Dec 7; light and railroad plants op. from same station, M Cay, Dec 28-**92**

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El Rev Lond independent engines for, Church * Apr 13; transformers vs. accums., Crompton * Apr 20, 27, May 4; breakdowns, R. J. Jones * June 22; cost, Fritsche * Aug 31-**88**; cen., notes, Yeaman, Nov 21-**90**; materials * Mar 13; combining contin. and alt. cur. systems, Leonard, Oct 2, 9; how to get paying loads for, Marks, Dec 4-**91**

El Rev construction, Woodbury * Feb 22; econom. steam gen., Babcock, Mar 1; accounts system, T. C. Smith, Mar 1; insurance, Barton, May 31, July 19-**90**; building, Berlin Iron Bridge Co. * Jan 10; steam distrib. from, Prentiss, Feb 28; accounts, uniformity in method, Burleigh, sup. Sep 19; cen., op. by water power, Redman, 19; how to get paying loads for, Marks, Nov 21-**91**; and power, Mackie, July 23, 30, Aug 13, 20, Sep 10-24, Oct 8, Nov 5, 12-**92**

El Wld accounts, T. C. Smith, Feb 22: Woodbury * 22; value of details in, DeCamp, Aug 30; as an investment, Sunny, Oct 25-**90**; steam distrib. from, Prentiss * Feb 28; uniformity in accounts, Burleigh, Sep 19; op. by water power, Redman, 19; how to get paying loads for, Marks, Nov 21-**91**; the lamp, manager and customer, Roberts * Mar 19; load curves * Feb 27-**92**, * *Electrician Lond*

E News Keswick, England, water power, inset * Sep 13-**90**; op. by water power *E Rec* Oct 10-**91**; running *Pwr* * Sep - Dec -**90** * Jan - Mar * Sep * Nov -**91**; hazards, Low *Sc Am Sup* Apr 9-**92**; stats. *St R J* Sep -**90**; Soc. L'Eclairage Elec., France *The Eng* * Nov 1-**89**; U. S., Addenbrooke, Jan 10, 24, 31-**90**; arc station management, June 24-**92**. See also ELEC. lighting, names of places

SUEZ canal, Sellon *El Rev Lond* * Sep 14-**88**

TAMWORTH, New So. Wales, Dymond *Inst C E* * v 108 -**92**

TESLA's system with curs. of high frequency *El Rev Lond* * July 17, *El Rev* * July 4-**91**

TIVOLI station *El Rev Lond* * July 15-**92**

TOPEKA, Kan., Kingman, discuss. *Am C E* v 26 -**92**

VENICE station *Eng* * Aug 14-**91**

WASHINGTON, U. S. Navy Yard, Brush arc station, Wilkes *El Eng* * May 21-**90**

WESTINGHOUSE alt. arc system *El Eng* * Apr 2-**90**; (full) *El Rev* and sup. * Oct 27, alt. stations (list) Nov 10-**88**; *Eng* * Feb 8, 22 * Mar 15-**89**; abs. *Inst C E* v 101 -**90**

Electric LIGHTING, WESTMINSTER Elec. Light Co. station *El Rev Lond* * Mar 18-**92**

WIRING leads cal., graphic method, Hering *El Eng* * May 27 -**91**. See also ELEC. wires

WORCESTER, Mass. station, Shaw *El Eng* * Dec 10-**90**

LOAD equalizer, Mailloux *El Rev Lond* * Dec 26-**90**

LOCK, electro-mag. permutation, Sedgwick's *El Rev* * Sep 28 -**89**

LOCOMOTION, Edison pat. *El Rev* * Oct 4-**90**

LOCOMOTIVES, Dobbie's gearless *El Eng* * June 10; Eickemeyer's gearless *El Rev* * June 13-**91**; proposed, Pellissier *El Wld* * Aug 6; tests, Siemens * 27-**92**; ed. *The Eng* June 13-**90**

LOG *El Rev Lond* * Jan 30-**91**

MACHINES, Wimhurst influence, Darke, cor. *Eng* * Feb 14-**90**, theory, Pellissier *Sc Am Sup* * Nov 14-**91**. See also ELEC. influence machine; DYNAMOS; ELEC. motors

MAGNETIC susceptibilities of various iron and steel, Niegbaur *El Eng* * Feb -**90**; reluctance, Kennelly (full) * Nov 4-**91**; propagation, E. Thomson, Wightmann *El Rev Lond* * Oct 26, do. *El Wld* * Oct 27-**88**; screening, variational, W. Thomson * May 9, do. *El Rev Lond* May 1-**91**; leakage, Ives * Jan 22, 29; balance, Du Bois * Sep 2, do. *El Wld* * Sep 24-**92**; non-magnetic balances and alloys, Haswell, Webb *El Rev* June 23 -**88**; field, change of form affecting, Dolbear, Mar 21-**91**; permeabilities of irons, Thompson * July 2-**92**; call and integraph, the Abdank *El Wld* * Nov 24-**88**; Eickemeyer's gauge * Nov 9-**89**; mag. circuit notes, Steinmetz, June 4; permeabil. of special irons, M. E. Thompson * 25; viscosity expts., Hopkinson * Oct 1-**92**; field, early conception, Houston *F Inst* Mar -**92**; circuit, theory, Collins *Tech Q* * May -**89**

MAGNETO-motive force and mag. formulas, Emery (full) *El Rev* * Aug 27 * Sep 3-**92**

MAGNETS, permanent, character of steel used for, Preece (full) *El Rev Lond* * Sep 12-**90**

MAGNETISM, relation to induced elec. mo. force and cur., E. Thomson (full) *El Wld* * June 1, *El Eng* * June -**89**; Hopkinson * Apr 9-30-**90**; twisting, Balch * Sep 14-**92**; in watches, Giles *El Rev Lond* * Oct 26, Gribi *El Rev* June 9, (full) *El Wld* * June 30-**88**; induced, Ewing * Oct 4, 11, *El Rev Lond* * Oct 3-**90**. See also MAGNETISM

Electric MAGNETIZATION, permeabil. of iron at right angles to direction of, Kennelly *El Eng* * June 11, 18-**90**; curves for, Emery * Dec 28-**92**; of iron, time-lag in, Ewing (full) *El Rev Lond* * Nov 8-**89**; changes produced by, in length of iron wires, Bidwell, Oct 14; of iron, electro-chem. effects, Andrews * Nov 25-**92**; formulas, Emery (full) *El Rev* * Aug 27 * Sep 3-**92**; of iron in very strong fields, Ewing *El Wld* Dec 22-**88**; curves of iron, under alt. curs., Moore * June 4-**92**; theory and formula for soft iron, Collins *Tech Q* * May -**89**

MEASUREMENTS, W. Thomson's instrums., Fleming *El Wld* * Feb 25, *El Eng* * May -**88**, by Weston high resist. voltmeter, Loomis * Dec 24-**90**, *El Rev Lond* * Jan 9-**91**; measuring ap. standardizing, Berlin, Aug 9-**89**; Anthony *El Rev* Jan 21; methods, Liebig, sup. Sep 8-**88**; wiping contact methods for cur. and poten., Thomas * July 30, *El Wld* * July 2-**92**; voltametric of alt. curs., Kennelly * Nov 3; in a house to house supply, Lowrie * 17-**88**; units and measures, Internat. conference, Paris (full) Sep 21-**89**; applics. of Weston voltmeters and ammeters, Maschke (full) * Mar 26 * Apr 2-23-**92**; Lowrie *Eng* Oct 5-**88**; Webb *E Mag* Oct; instrums., Swinburne *E News* Sep 15-29, (full) *Inst C E* * v 110-**92**, *The Eng* * May 6-**92**; as applied to commercial work, Anthony *F Inst* Jan -**88**; constant shunt method for large contin. curs., Pike * June -**92**; resist., Bauer *Pwr* * Mar -**92**

METERS *El Eng* Shallenberger's * Sep -**88**; Edison chem., Jenks (very full) * Jan -**89**; the Walker * Apr 9; Wood's * Dec 17-**90**; the Meylan-Rechniewski energy * Mar 18, Eickemeyer's differential magnetometer, Steinmetz * 25; alt. cur. potentiometer, Moler * May 27-**91**; Pilkington-White * Apr 13 -**92**

El Rev Lond Geyer-Bristol, for direct and alt. curs. * Dec 21, 28-**88**; Edison chem., Jenks, Jan 11 * 25, Feb 1, 8; for central stations, Forbes, Feb 1, 8; Cardew recording * Nov 15-**89**; com. report, Mar 28; Blathy alt. cur. * June 20; Thomson's * Aug 15; W. Thomson's * Oct 10; Mares' energy * Nov 7; Shand, Dec 5-**90**; Meylan-Rich. energy * Feb 13; Ferranti's * Mar 20; Frere's * 20-**91**; Brillie energy * Apr 29; Scott's * Dec 16, *The Eng* * Dec 16-**92**

El Rev for central stations, Forbes, Feb 16; the Slattery * Oct 12-**89**; Edison electrolytic, Kennelly * Oct 4-**90**; Walker, May 30, discuss. June 13-**91**

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El Wld Shallenberger's alt. cur. * Sep 15; Geyer-Bristol, for direct and alt. curs. * Nov 24; Reckenzaun & Pentz's * Dec 29-**88**; Edison chem., Jenks (full) * Jan 5; Nipkow's alt. cur. ammeter * Mar 9; E. Thomson's oscillating * May 4; the Walker * July 20; the Manwaren * Dec 7-**89**; the Walker * Apr 12, May 30, discuss. June 13; Shand, Nov 22-**90**; Perry's elec. supply * July 11-**91**

Inst C E for recording consumpt. of elec. energy, Wordingham, insets (full) * v 108-**92**; Mares' energy, Juppout, abs. v 103 -**91**. *Genie Civil* * 17-**90**; Hobart *Pwr* * June-Sep -**89**; the Wood ammeter *Sc Am Sup* * Jan 14-**88**; radiation meter, Gregory * Dec 14-**89**; * Jan 25-**90**; the Frager *The Eng* * May 29; the Teague * June 19-**91**. See also ELEC. ammeters—ohm — secoh — tele — volt — watt meters

MINING machinery, Atkinson *Eng* Feb 13, *E News* * Aug 8; energy transmiss., Leonard and ed. * May 16, Edison elec. percussion drill, 16; Aspen Min. & Smelting Co. * Oct 10-**91**

MOLDINGS, standard for elec. work *El Rev* * Nov 15-**90**

MOTIVE force, thermo-chem. relation to, Siebel· *El Eng* July 9-**90**, relations to atomic wt., chem. heat, etc., Gore, *El Rev Lond* June 12-**91**, general relation to equiv. vol., Gore, June 3-24-**92**, constant with variable speed, Hoho *El Wld* * Jan 25-**90**, equation, for resist. and self-induc. circuit, Bedell (full) May 14-28, June 4-**92**; properties of the human heart, Waller * Nov 3, *Sc Am Sup* * Nov 24-**88**, *El Rev*; power, Thorenberg plant *Sci Am* Dec 1-**88**

MOTORS, *Am C E* comparative tests and st. locom., Manhattan eleva. R., Moss, and discuss., insets * v 23 -**90**

El Eng alt. cur., Duncan (full) * Mar, Mar; Liebig, Mar; designing, Walker, May; 2 h.p. Sprague, expts., Cox * June * Aug; alt. cur. and transformers, new system, Tesla (full) * June, June, Swinburne, Sep; service charges basis, Lufkin, Sep -**88**

El Eng diags., Clarke * Jan; regulation, Crocker * June; and dynamos, Perret * Aug; speed regulation, Deprez on, Paget * Aug; alt. cur. evolution, Patten * Oct -**89**

El Eng Swinburne's alt. cur. * Apr 16; Tesla's alt. * Aug 6; rates basis, Lufkin * 27; Tesla's new alt. Sep. 24; building, Short elec R. system * Oct 15; Bradley's alt. * Nov. 5, self-exciting * 12; windings, Serrell, Dec 10; Riker low speed multipolar contin. cur. * 17-**90**

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El Eng inventors of (Thomas Davenport) Pope (full) * Jan 7-28 * Feb 4; Patten's alt. * Mar 4 * May 13; alt. cur. design, Weston * Apr 1; perfection of stationary, Crocker * May 27; alt. cur., Hospitalier, Aug 26; op. at any speed or torque, with max effic., Leonard * Nov 25; law of max. effic., Mailloux, Dec 9; polyphasal generators, Pupin * 23-**91**

El Eng the Perret (full) * Jan 6; law of effic., Mailloux, Jan 13; alt. cur., Stanley * Mar 2; gearless, Short * Apr 13; Excelsior, Muldaur * Sep 14; Lundell fan * Dec 7-**92**

El Rev Lond simple * Apr 13; alt. cur., Tesla's new system * June 15, ed. 22 * 22-**88**; design, Snell, Feb 1; speed reg., Deprez, Apr 26, *Compt r;* regulation, Crocker *El Rev Lond* * June 14; alt. cur., evolution of new type, Patten (full) * Oct 11-**89**; armature reactions, theory, Swinburne * Feb 14, 21, Mar 28, Apr 4; op. with high tension curs., Sperry * Feb 21, 28; design, Esson * 28 * Mar 7, 14; Tesla's alt. * Aug 22, Oct 3-**90**; alt. cur. design, Weston * Apr 17; Hutin & Leblanc's alt. cur. * July 24; Edison's * Aug 21-**91**; leakage, Ives * Jan 22, 29-**92**

El Rev Liebig, Feb 25; alt. cur. and transformers, new system, Tesla * June 2, 9, Weyde * July 14; service charges basis, Lufkin, Sep 22-**88**; Bradley alt. cur. imps. * June 22; alt. cur. Patten * Sep 28-**89**; armature reactions, theory, Swinburne * Mar 15; imps. do. * Apr 19; Tesla's alt. cur. pats. * Aug 16; rates basis, Lufkin * 30-**90**; Eikemeyer's novel * Mar 28; Edison small slow speed * May 30; the perfection of stationary, Crocker * June 6; alt. cur., Hospitalier, Sep 12; Bradley's alt. cur. * Oct 2; perfect, Everett, 31; aut. op. at any speed or torque, Leonard * Nov 28-**91**; alt. cur., Stanley * Mar 12; Ryan series reg. test, Bliss, Dec 31-**92**, *Sib J Eng*

El Wld the Patten * Jan 7; effic. tests, Crane * Feb 4; alt. cur., Duncan (full) * 25; Liebig, Mar 3; reg., priority of invention, Sprague * Apr 7, 14; cal. and designing, Crocker * 28; alt. cur. and transformers, new system, Tesla * June 2; the Lugo * July 14; service charges, basis for cal., Lufkin * Sep 8; designing, Owens * Nov 17-**88**

El Wld alt. cur., Tesla, May 25; reg., Crocker (full) * June 1, discuss. * 8; the Perret * Feb 2, July 6 * Aug 3; alt. cur, ev. of new type, Patten (full) * Sep 28; Industries' prize, n * Dec 7; new prin. of constructing, Mailloux * 28-**89**

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El Wld relation to elec. lighting Co's, Fitzgerald * Feb 1; op. with high tension curs., Sperry, 15; design, Esson (full) * Mar 22, 29 * Apr 5, 12; the Zipernowsky-Deri-Blathy synchronous * Mar 29; Perret multipolar * July 26; alt. cur., new types * Aug 16; Van Depoele induction * 16; rates basis, Lufkin, diags. * 30-**90**

El Wld work of Dow, in torpedo service, Apr 18; alt. cur., Duncan * May 9, 16; perfection of stationary, Crocker * May 30, discuss. June 6; alt. cur., Hospitalier * Aug 29; Frankfort-Lauffen three-phase, Hering (full) * Oct 31 * Nov 7; aut. op. at any speed or torque, with max effic., Leonard * Nov 28-**91**

El Wld magnetic leakage, Ives (full) * Jan 2; alt. cur., Stanley (full) * Mar 5; alt. cur. self-starting and exciting synchronous, Patten * Apr 2; cal; Bedell, diag. * 30-**92**

Eng alt. cur., ed. Nov 20; the Short gearless *E News* * Sep 5-**91**; in workshops, Jenkin *Inst C E* * v 102-**90**; small, effic., Clifford, abs. v 91-**88**, *Am Acad Arts & Sci* v 22-**87**; *E Rec* * Nov-**90**; cal., Bedell, inset *F Inst* * June-**92**

Pwr the Baxter * Dec-**88**; Thomson's * Jan; reciprocating * Feb-**89**; Simple * Jan-**90**; (various) * Jan-**92**, *Elec Industries*; (growth of business) Pope *R & Eng* Sep-**89**

Sc Am Sup the Menges thermo-mag, generator * Feb 18; simple, making, Hopkins * Apr 14; charges, basis for cal., Lufkin, Sep 22, Nov 3-**88**; the Tesla * Apr 6-**89**; home made, Parkhurst * Aug 2-**90**; small, Hopkins * Jan 3-**91**

St R J building, Short R. Co. * Oct-**90**; max. effic. conditions, Leonard, Mailloux, Jan-**92**; small, effic., Clifford *Tech Q* Sep-**87**, Feb **89**; small, comparative working expenses of, Korte *The Eng* Jan 22-**92**, *Zeit deut Ing*-**91**. See also DYNAMOS; ELEC. generators; RAILROADS, elec. motors

NAVIGATION, Bennett, *El Rev Lond* Apr 10-**91**.

OHM'S law, extension of elec. mo. force and Oudin *El Eng* Dec 30-**91**; expt. proof, Mayer * July 9, *El Rev Lond* Aug 1-**90**; units, the volt, ohm and ampere, Nipher * Apr 27, ohm det., Wuilleumier, July 13-**88**, suggestions, J. V. Jones (full) Sep 12; the Evershed *El Wld* * Jan 11-**90**; alt. cur., Swinburne * Dec 19-**91**; units, ohm, Glazebrook, Jones *Eng* Sep 26-**90**, new det. of *Sc Am Sup* * Feb 16-**89**; law and electro-therapeutics, Winton, July 26, expt. proof, Mayer * Aug 2-**90**, *Am J Sci*. See also ELEC. units

ELECTRIC OMNIBUS, London *Sc Am Sup* * Mar 2-**89**, *El Eng*
ORE-dressing, Tilly Foster mine, McDowell *E News* Oct 4-**90**
ORGAN, control, Hope-Jones *El Rev Lond* Jan 15-**92**; Wacker's action *El Wld* * Nov 23-**89**; organs, Swinburne * July 4-**91**
OSCILLATIONS, Hertz's researches, Tunzelmann *El Eng* Feb * Apr, May * July * Aug, Joubert * Oct -**89**; in air, Trowbridge *El Rev Lond* Oct 17, (full) *El Rev* * Dec 6-**90**
PARCEL exchange system, Bennett *El Rev Lond* * Sep 4, *Eng* * Sep 25-**91**
PATENTS, U. S. stats., Lockwood *El Eng* Feb -**88**; see *El Rev* files, especially 1890, progressive * Mar 26 * Apr 16 * June 4-**92**
PIPE bending *El Wld* * June 18-**92**
POLYPHONE, Zigang's *Sc Am Sup* * Oct 12-**89**
PORTELECTRIC Co's transport. system, N. E. *El Eng* * May 27, Pope report *El Rev Lond* June 5 *El Rev* * May 30-**91**, do. *El Wld* May 23-**91**, carrier * Oct 10-**90**
POTENTIAL, high, phenomena, Skinner *El Wld* * May 7; differences, Negbaur, Nov. 26, Dec 3. 10-**92**
POWER, elec. motor and st. locom. test, Manhat. eleva. R., Moss., insets *Am C E* * v 23 -**90**; distrib., Spaulding, insets *Cassier's* * Dec -**91**; and steam, Wright, Aug -**92**

El Eng standards of econ. in gen. of, Swetland * Aug 27-**90**; comparative cost, effic. of large and small motors, Wheeler, Apr 29; econom. limits of large units, Church * Dec 2, 9-**91**; Edison works, Schenectady, N. Y., Martin (full) * Feb 3; plant at Chic. World's fair, Collins * Mar 23-**92**; distrib. by alt. curs., Tobey *El Rev Lond* * Feb 5; distrib. by direct curs., Dow, 26-**92**; rates *El Rev* Aug 1-**91**

El Wld measurement by voltmeter, Swinburne * Apr 18; measurement of any elec. cur. to any circuit, Ayrton, Sumpner * May 2, 23; measurement developed by alt. curs. in any circuit, Hering * Dec 26; distrib. by alt. curs., Stanley * June 13-**91**, Leblanc *Lum Elec*

El Wld distrib. by direct curs., Dow, Feb 6; by alt. curs., Stanley, 6; Thomson's law of economy, Carter, July 30; station distrib., Unwin, Aug 20, 27; supply cost, Hopkinson, Dec 3, 10, 24; gen. at coal-fields and transmiss. to industrial centers, Thwaite * 31-**92**

Eng econom. limit of large units, Church, Jan 8; altruistic effects, Perrine *E Mag* Jan -**92**; technically considered, W.

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Allen *E News* * Nov 1-**90**; distrib., Spaulding *Pwr* * Dec -**91**, *Am M E*, *Sc Am Sup* Jan 16; gen. in coal-fields, Thwaite *The Eng* Dec 2-**92**. See also ELEC. motors; RAILROADS, elec. power stations

POWER Transmission, *Am Min* present status, Rothwell v 17 -**89**; in mining operations, Spaulding, insets (full) * v 19 -**91**

El Eng (energy) * Feb -**88**, *Industries;* Kapp *El Eng* Mar 25; at very high potens. * Apr 8; Leonard (full) Sep 2-**91**; long dist., Hart * Jan 13; high poten., E. Thomson, Mar 23; long dist., Scott * June 15-**92**

El Rev Lond Sprague, Mar 22 * 29, May 10; long dist., from over compounded gens., Serrell * Dec 6-**89**; Kapp, tables, Feb 20, Mar 6, (full) July 17 * Aug 7-28-**91**; Frankfort plan, Hering, Apr 8; multiphase and distrib., Reckenzaun, Apr 29 * May 13, June 24; long dist., Thwaite, Dec 16-**92**

El Rev Roberts * Aug 31-**89**; Kapp (full) Aug 8; long dist., Frankfort, alt. curs. differing in phase (rotary curs.), Dolivo-Dobrowolsky * Sep 19; Lauffen-Frankfort, Kapp * Oct 10-**91**; long dist., Hart * Jan 16; high poten., E. Thomson, Mar 26; long dist., Scott * June 25; by alt. curs., Kapp * Sep 17; future, Oct 15-**92**, Industries; *Electrician Lond*

El Wld long dist. cals., Serrell, table, May 25; Roberts * Aug 17; long dist., from over-compounded gens., Serrell * Nov 16-**89**; Mar 14; high pressure, at Oerlikon, May * Apr 18; Lauffen-Frankfort plant, Hering (full) * Sep 26 * Oct 31 * Nov 7; by alt. curs., Dolivo-Dob. * Oct 10-**91**

El Wld Lauffen-Frankfort tests, Hering, Jan 9, discuss. (full) Mar 5, effic. * July 2; diags., Schlesinger * Mar 5; Bell, 19; high poten., E. Thomson, 26; multiphase, Reckenzaun, May 21, June 11, July 23; long dist., Scott (full) * June 18; effect of harmonics on alt. cur., Rowland, Dec 10; gen. at the coal-fields and transmiss. to industrial centers, Thwaite * 31-**92**

Eng ed. Feb 20, 27, Mar 6-**91**; cost, Mansfield, n *E & Min* June 23-**88**; Rothwell, Jan 5-**89**; in the west, July 23-**92**, *El Eng;* Nevada mill *E News* Apr 12-**90**; alt. curs. for * Aug 22-**91**; Hering, Mar 19-**92**; Sprague *F Inst* * Mar -**89**; Lauffen-Frankfort, table, Aug; Griffin (full) Sep -**92**; by alt. curs., Stort abs. *Inst C E* v 106 -**91**; cost, Lahmeyer, v 109 -**92**, *Elek Zeit* -**91**-**92**; Geipel *Inst M E* Feb -**88**

Pwr long dist., Hart, Feb, Jackson, Apr, high poten., E.

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Thomson, May; Griffin * Oct -**92**; Morris *R & Eng* May -**92**; * Oct -**90**, *Genie Civil;* Sprague (full) *Sc Am Sup* * July 20, 27 * Aug 3-**89**; * Mar 3-**88**, *Industries;* long dist., Hart *Tech Q* * Apr -**92**; Kriegstettin to Solothurn, expts. *The Eng* Apr 13-**88**; West, Jan 16; Lauffen-Frankfort install. * Oct 2, 9, oerlikon alternator * 23-**91**. See also RAILROADS, elec. power stations

PROJECTILES, elec. welded, Maxim *Cassier's* * Oct, *El Rev* Aug 6-**92**

PUMPS, pumping in collieries, Brain *El Eng* Jan -**88**; Dittman's vac. *El Wld* * June 4-**92**; Hall's pumping plant *E News* May 5-**88** * Mar 15-**90**; three-cyl. elec., Gould Mf'g Co. * Nov 14 -**91**

RAILROADS, elec. working of, W. E. Hall *E News* July 12, limitations of steam and electricity in transport. 12-**90**. See also RAILROADS, elec.

RECORDING instrums., Holden, Drake and Gorham's *El Rev Lond* * Sep 30-**92**

REGISTER, Ongley *El Rev* * Jan 31-**91**

REGULATORS, Herrick *El Wld* * Apr 5-**90**

RESISTANCE, *El Eng* compensated standards, Nichols * June -**88**; specific, of paper * June; of elec. light installs., Jamieson, Oct -**89**; specific, of metals and alloys, Prescott, Apr 30, May 7; inductive det., Steinmetz, Oct 29, Nov 5-**90**; insul., measuring, Patterson * May 20; of copper, standard for, Holman, Nov 18; compensating, for galv. shunts, Frey * Dec 23-**91**; standards, Willyoung, June 1; insul., of cotton and silk covered wires, Luquee * Dec 28-**92**

El Rev Lond compensated standards, Nichols, Aug 10-**88**; insul., of elec. lighting station, Jamieson, Jan 25; standard, design, Fleming * Feb 1-**89**; of mercury, Glazebrook, Sep 19; spec., of copper, Fitzpatrick (full) 26; of metals, Le Chatelier * Oct 17; wire standard resists. Dec 26-**90**; human body, value of diminished, Cardew, Mar 13; of conductors, measurement, Appleyard * Dec 18-**91**; of pure metals, alloys, Nov 11-**92**; of mercury, det., Glazebrook *El Rev* * Oct 18 -**90**

El Wld compensated standards, Nichols, June **9-88**; of iron and its alloys at high temps. * Apr 19; of mercury, det., Glazebrook, Oct 11; wire standard resists., com. report, Dec 6;

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coils and boxes, Frey * 20 * 27-**90** * Jan 3, 10; coils, alloys for, Feussner, Mar 14-**91**; non-inductive construction, Ayrton, Mather * Feb 13; of parallel circuits, Bedell * Oct 15-**92**
F Inst Megohm, Davids, Apr -**91**; standards, manuf. and adjustment, Willyoung, Apr -**92**; of metals, steel, Le Chatelier, abs. *Inst C E* v 104 -**91**, *Compt r* v 111 -**90**, 112 -**91**; of pure metals alloys *Sc Am Sup* * Dec 31-**92**. See also under ELEC. insulation
RETARDATION due to iron pipes, Preece *El Wld* May 21-**92**
RHEOSTAT, new, C. E. Carpenter *El Rev* * Nov 5-**92**
ROUTING machine, Irish's *El Wld* * Nov 2-**89**
RULES, fire ins., Hartwell (full) *El Rev Lond* Sep 12-**90**; right hand and other rules, Maycock * Jan 15-**92**; elec. light ins. rules, England *El Rev* Jan 14-**88**. See also ELEC. insurance rules — lighting regs.
SAFETY devices, E. Thomson *El Rev Lond* Mar 14, *El Rev* Feb 22-**90**. See also ELEC. insurance
SCHISEOPHONE (flaws in metals) *El Eng* * July 16-**90**
SCREENING, electrostatic, by gratings, etc., W. Thomson *El Rev Lond* Apr. 17; and magnetic, variational, do. *Sci Am Sup* * May 16-**91**
SEARCH light, Hutchins *Cassier's* * Dec, Knowles (full) *El Eng* * July 27 * Aug 3, 24-**92**
SECOHMETER, Ayrton & Perry's *El Rev* * Apr 20-**89**
SECRET service, individual telegraph call *R Gaz* * Aug 28-**91**
SEEING to a distance, Weiller, cor. *Sc Am Sup* * Feb 8-**90**, *Genie Civil* v 15, *Lum Elec*, *El Rev*
SEWAGE purification, Gilley *Soc Arts Mass* -**90**
SHUNT, constant method, errors in, Puffer *El Rev Lond* May 11-**88**
SIGNAL ap., Morgan's aut. system *El Rev* * June 7, *Eng* * May 16-**90**
SMELTING and production of aluminum, Boby *Sc Am Sup* * July 13-**89**. See also ALUMINUM
SNOW sweeper, General Elec. Co. *Sc Am Sup* * Dec 31-**92**
SOLENOIDS, properties, S. P. Thompson *El Rev* Feb 21-**92**; variable action of two-coil, Aldrich *F Inst* * Apr -**92**
SPARKS, nature, in elec. vibrations of Hertz, Bischoff *El Rev Lond* * Sep 25, Oct 2-**91**; sparking, Serrell *El Wld* * Nov 10-**88**

Electric STANDARDS, com. report *El Rev Lond* Sep 26, Oct 10–**90**; Oct 16, discuss. 30–**91**; Pellet report, Sep 13, 20, *El Wld* Sep 7–**89**; com. report, Sep 26–**91**; Brit. Assoc. Sep 3–**92**; com. report *El Rev* Oct 3–**91**, *The Eng* sup. Dec 9–**92**. See also ELEC units

STOCKS, English, table *El Rev Lond* Dec 16–**92**; market *El Wld* Dec 6–27–**90**

STORAGE, of the alt. cur., Foppl, abs. *Inst C E* v 102 –**90** * *Elek Zeit* –**90**; storage batteries. See STORAGE bats.

STORM phenomena *El Eng* * Aug 24–**92**

STOVE, Giraud's thermo-elec., Hospitalier, abs. *Inst C E* v 105, 106 –**91**, *Genie Civil* * v 19 –**91**, *Sc Am Sup* * July 18 –**91**. See also ELEC. heating

STRESS, optical demonstration of, Rücker *Eng* * May 18, *Sc Am Sup* * May 19–**88**

SUBWAYS, N. Y. Bd. of Elec. Control, report *El Wld* Jan 12–**89**, Jan 25; practical working, Maver, discuss. Mar 15–**90**; of N. Y. City *E News* Apr 21 * May 5, 26; of Phila., cor. * June 9–**88**; of N. Y. *Sci Am* Apr 20–**89**. See also ELEC. wires, underground

SUGAR refining *E News* Sep 22–**88**

SUPPLY, cost, Hopkinson *El Rev Lond* Nov 11–**92**. See also under ELEC. lighting

SWITCH-boards, Manhattan Elec. L. Co. *El Rev* * May 7; multiple, Baylis, July 9–**92**

SWITCHES, designing, Offrell *El Wld* June 21–**90**; and switching *Pwr* * June * July –**91**

TABULATING, Hollerith system, com. report *F Inst* * Apr –**90**. See also CENSUS counting ap.

TANNING *El Rev Lond* June 26 * July 3, 10–**91**, *El Rev* June 14, hist. n *El Wld* Sep 27–**90**

TELEMETER system *E News* Oct 5–**89**; Fiske's (marine dist. instrum.) Brylinski abs. *Inst C E* v 106 –**91** * *An Telegr.* –**91**

TERMS and phrases, Maycock *El Rev Lond* * Mar 25–**92**; (list) *E Rec* June 2–**88**

TESTING, Handbook of, Kempe, bk., Spon; of iron, Swinburne *El Wld* * Sep 27–**90**; ap., construct. and use, Frey * Jan 17–31 * Feb 7–28 * Mar 7, 14–**91**

TIME. See TIME, electric

TRACTION, de Coetlogon *E News* * Aug 18–**88**; the Ries increaser (locomotive) * Aug 9–**90**

Electric TRANSFER table, Sprague, Altoona, Pa. *El Wld* * Apr 13; Fitchburg, Mass. * Nov 16-**89**

TRANSFORMATION, alt. – direct cur., proposed system, Patten *El Wld* * Feb 27 * Mar 19-**92**

TRANSFORMERS *El Eng* alt. cur., Kapp, discuss. (full) * Apr, Apr, new system, Tesla (full) * June, and contin. cur. system, comparative value, Badt, July, Swinburne, Sep -**88**; Ryan, and discuss. (full) * Jan, Jan; effic., Humphrey * July 2-**90**; distrib., Swinburne * Apr 1, 8; alt. cur., geomet. theory of, Steinmetz, June 3-24, July 1-29, Aug 5 – Dec 23-**91**; relation of size and effic., Stillwell, Mar 2-**92**

El Rev Lond alt. cur., Kapp (very full) * Feb 17, distrib. by, Mackenzie * 17, 24, Mar 2, 9, Crompton * Apr 20, 27, May 25; new system, Tesla * June 15, 22, ed. 22; distrib. by, Gutmann, Oct 26; (secondary generator) pats., Gaulard & Gibbs vs. Ferranti, July 13-**88**, Mar 8; Ryan * Jan 17; reg. cur. or poten., E. Thomson's method * Apr 26; hist., Wilking's, Gelyi, May 17, 24; losses due to hysteresis in, discuss., E. Thomson, Tesla, June 13; description, Swinburne (full) Sep 20; Picou, report, 20-**89**

El Rev Lond distrib., Swinburne, Feb 27, Mar 6, 20; effic., Stanley, Mar 6, 13-**91**; relation of size and effic., Stillwell, Apr 22; distrib. by alt. curs., Kennedy, 22, May 6 * 20 * 27; hist. of tension-reducing * May 27; Perry, June 3; tests, Hopkinson report (full) * July 1; effic. at different frequencies, Ayrton, Sumpner * Sep 23, imps. * 23; alt. cur., expts., Fleming (full) * Dec 2-30; Ferranti (full) 30-**92**

El Rev new system, Tesla * June 2-**88**; Ryan, Dec 28-**89**; effic., Humphrey (full) * July 5-**90**; German cur. * June 20-**91**; relation of size and effic., Stillwell, Mar 5; 17,500 watt, test report, diag. Oct 1-**92**

El Wld alt. cur., Kapp * Mar 17, 24; contin. cur., Sellon * May 5; new system, Tesla * June 2; points in distrib. by Gutmann * Oct 13-**88**

El Wld E. Thomson's method of reg. cur. or poten. in secondaries of * Apr 13; Kapp regulating * May 4; and Ganz alt. machine, Forbes * 25; Picou, Sep 7; Paget's alt. cur. * Nov 16; tests, Ryan (full) * Dec 28; design of commercial, Swinburne, 28-**89** * Jan 11, 25, Ryan, discuss. 11; effic., Humphrey (full) * July 5; distrib. by, from cen. and eccen. stations, Ganz system, Fleming (full) 26 * Aug 2-30, Sep 6 * Oct 25 *

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El Wld relation of size and efflc., Stillwell, Mar 5; effic., Dobrowolsky * May 28; the Rowland, July 9; Westinghouse 6,500 watt, test, Hopkinson * 16, 23; test of 17,500 watt Stanley, Ryan * Oct 1; effic. at different frequencies, Ayrton, Sumpner * 8, 15; hysteresis measurement in, Evershed * 15, 22; universal, Appolonj * Dec 10; alt. cur. expts., Fleming * 24-**92**

Eng pats., ed. Mar 8-**89**; interference with alt. curs., Ayrton, Mar 27-**91**; Haskin's, bk. n *E News* Sep 29-**92**; alt. cur., Kapp *The Eng* Feb 10-24-**88**; alt. cur., Fleming, bk. review, Aug 26-**92**

TREE felling machine *Sc Am Sup* * Mar **2-89**, *Industries*

UNDULATIONS, Hertz's expts., Bertolini *Eng* * Dec 12-**90**. See also ELEC., Hertz's

UNITS, Crocker *El Eng* Dec 31-**90**; Brit. Assoc. Oct. 14-**91**; the volt, ohm and ampere, Nipher *El Rev Lond* * Apr 27; ohm det., Wuilleumier, July 13; nomen. Dec 7-**88**; and standards, Pellet report, Sep 13, 20-**89**; com. report, Sep 26, Oct 10-**90**; of measurement, absolute, Moon, May 1; and standards, report, Oct 16, discuss. 30-**91**; nomen., Lodge, Aug 12-26-**92**; Crocker *El Rev* Jan 3; and standards, report, Oct 3-**91**

El Wld the volt, ohm and ampere, Nipher, Apr 7-**88**; standards, Pellet, Sep 7, and measures, Internat. Elec. Con., Paris (full) 21-**89**; of present and future, Crocker, Jan 3; Kimball (full) * 17-31; and mag., absolute dimens., Rodgers, May 2; and standards, com. report, Sep 26-**91**; do. Brit. Assoc. Sep. 8-**92**

Eng ohm, Glazebrook, Jones, Sep 26-**90**; new det. of ohm *Sc Am Sup* * Feb 16-**89**; of present and future, Crocker, Apr 11-**91**; (terms) *St R J* Oct-**89**; and mechan. *E & Min* Aug 9, *The Eng* July 4-**90**; electro-magnetic, Nov 27-**91**; standards, com. report, sup. Dec 9-**92**. See also ELEC. ampere — ohm — standards — volt — watt, etc.

VACUUM discharge streamers action, Pupin *El Eng* * Apr 20-**92**; tube discharge, Tesla *El Wld?* June 10 * July 1-**91**

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El Rev Lond portable, for measuring alt. poten. differences, Ayrton (full) * Jan 13-27-**88**; Ayrton & Perry's hot wire * Mar 8; spiral coil, Ryan * June 28; W. Thomson's chain of electrostatic, Meikle * Nov 8-29-**89**; Ayrton & Perry's twisted strip * May 2-**90**; Sankey * Nov 27, Dec 4-**91**; Weston's * Jan 1-**92**

El Wld for measuring alt. poten. differences, Ayrton, Perry * Jan 28, Feb 4, 11; portable, do. Mar 10; Weston's * Nov 17-**88** * Feb 2; instrums. for measuring high potens. * 9; Ayrton & Perry's * Apr 6; spiral coil, Ryan * June 1-**89**; Ayrton & P's twisted strip * May 24-**90**; Weston, as a testing instrum., Merrill * May 21-**92**; and ammeter combination, A. White (full) * *Soc Arts Mass* -**90**

WATER conveyor, Bailey's, n *El Rev* * Aug 2-**90**; purification, Stanley-Quackenboss pat. *E News* May 17-**90**

WATTMETERS, Thomson recording *El Eng* * Nov 5-**90** * June 17-**91**; corrections to readings, Danielson *El Wld* * Mar 5, do. Friese, do. May 21-**92**; for alt. curs., Ganz *Eng* * Apr 5-**89**; abs. *Inst C E* v 94 -**88**, *Cen Elek* -**88**

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Life-buoy, the Franklin *Eng* * Nov 20-**91**
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Lifts. See ELEVATORS; HYDRAULIC lifts
Light, photometry, personal error in, Nichols *El Eng* * July -**89,** new photometer, do. * May 28, do. *El Rev Lond* July 4-**90**; photometric research, R. C. Richards * Mar 27 * Apr 3 * Sep 4 -25, Oct 2, 9, 16-**91**

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Light-houses, Sautter, Lemonnier & Co's exhibit, Paris *Eng* July 19-**89**; illuminants, ed. Oct 31; stability, E. Schmitt, cor. *E News* * Dec 6-**90**; fog or dipping ap. for elec. light in, Stevenson, inset *Inst C E* * v 92 -**88**; French, n *R & Eng* * Apr -**90**, *Genie Civil;* oils, Edwards (full) *Sc Am Sup* Mar 19; lens (large), Wigham, June 11, do. *The Eng* Apr 22-**92**; elec., Scand. exhib., Copenhagen, Nov 9-**88**; Douglass * Mar 29-**89.** See also WAVE pressure on structures

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MEW Is., Dublin, Griffith, insets *Inst M E* * July -**88**

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OYSTER Is., Burmah *The Eng* Sep 13-27-**89**

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El Rev peculiar motions of, Parker * Nov 24-**88**; arresters and self-induc., Acheson (full) * Jan 19-**89**; arresters and discov. of non-arcing metals, Wurtz * Mar 26; rods, McAdie, Sep 17-**92**

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Eng protection from, ed. Aug 3 * Sep 7; conductors, Brit. Assoc. pro. Oct 19, 26; flashes * Dec 21-**88**; rods, E. Thomson *E Rec* July 11-**91**; Jove's autograph, Jennings, insets *F Inst* * Jan -**92**; conductors, Kohlrausch, abs. *Inst C E* v 93 -**88**; do., connecting with water and gas pipes, Weber, abs. v 95 -**89**; conductors, Frisch report *Sc Am Sup* Jan 26; discharge, influence of gas and water pipes, Wilde, Aug 3-**89**; protection of chimney shafts, Molyneux, Wood, Apr 19-**90**; rod protection, Hodges, Apr 18-**91**; peculiar rotary motion of and elec. curs., Parker * *Soc Arts Mass* -**89**

Limberg, Charles T., por. *E & Min* * Apr 25-**91**

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Locomotives, Catechism of the Locomotive, Forney, bk. (very full) *R & Eng* * Jan -**88** – Oct -**89**; effic. of, Dixon *Am M E* * v 11 -**90**; econ. of the, Bell *El Wld* May 24-**90**; practice, ed, *Eng* June 29-**88**; express pass., Paris exhib., inset * July 5, do. ed. 26, Aug 2, 9; Brit., cost of working, table, Nov 8-**89**; tank express double bogie, Brunner, cor. * Sep 26-**90**

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BALDWIN, works erecting shop *R & Eng* * Dec -**90**; No. 10,000 *R Gaz* * Sep 27-**89**; Erie, 10-wheel express, inset * June 13-**90**; varieties built, June 5-**91**; in New So. Wales (full) July 15, Aug 19, *The Eng* July 1, Sep 23-**92**

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BELL-ringer, steam *R Gaz* * Mar 8-**89**; White's pneu. * Aug 8 -**90**

BENGAL & No. W. R., India, and rolling stock, Rhind, insets *Inst C E* * v 91 -**88**

BLAST, pipe, influence of intermediate tuyeres, Fliegner, abs. *Inst C E* v 91 -**88**, *Schweiz Baus* Nov 5-**87**; nozzle, Adams' variable *R & Eng* * Oct -**90**, *Eng*; pipes, Kordina's vortex *The Eng* Jan 20-**88**

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The Eng Leach's flexible stays, Feb 10-**88**; steel, Lond. & N. W., Webb * Oct 18 * Dec 6-**89**; experimental (compound tubular), Chemin de fer d l Est, France * Nov 13-**91**; construct. * Jan 1, 8 * Feb 5; Leahy, cor. * Apr 22; double, Eastern R., France * Mar 4, 11; Great Western, converted * Oct 21, 28-**92**

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CLEANER, the Trowbridge *R Gaz* * Jan 17-**90**

Locomotives, EXPLOSIONS, remarkable, Atlan. & Pac. *E News* * Jan 14-**88**; remarkable, Norwegian State R's * June 7-**90**; on Brit. R's *R & Eng* * Jan-Apr -**88**; in Europe *R Gaz* * Jan 18-**89**; in France and Algeria *The Eng* Aug 31, 31-**88**, in France since 1840 *An Indus* July 29-**88**; France, Belgium, Holland and England *The Eng* Jan 11 * Feb 1, 22-**89**

FIRE-boxes, the Darby crown sheet, Grand Trunk R., Can. *Eng* * Aug 24-**88**; Webb's * May 17, 17; corrug. steel, Lond. & N. W., Webb * Aug 23-**89**; the steam-jet as a means for preventing smoke *E News* * Apr 4-**91**; ed. *R & Eng* Jan; corrug. tubular, Knaudt, abs. June; fire-brick lined (full) * Oct, Phelps, cor. Nov -**89**; corrug., Lentz, Apr -**90**; Forney's door opener * June; corrug. * Sep -**91**

R Gaz and coal burning, Higginson, and ed. July 20-**88**; Master Mechanic's com. report, June 27-**90**; staying, Woods, Apr 17; Hawksworth's door opener * May 1; Ten Brinck fuel saving tests, Orleans R., France * 8, 22-**91**, *Ing Civils;* Webb's steel *The Eng* * June 14-**89**

JOHNSTONE compound *R Gaz* * May 27-**92**

KNAUDT & Pohlmeyer's, Prussian State R's *Eng* * Oct 4, *R Gaz* * Nov 15-**89**

LENTZ'S stayless *Eng* * Dec 19, *R Gaz* * Apr 4-**90** * Jan 9 -**91**

SPEIRS' construct. *E News* Jan 23, Dean, 30, (full) *R Gaz* Jan 22-**92**

WOOTTEN, U. Pac. express pass. *R Gaz* * June 15 * July 6-**88**

BOSTON & Albany 4-wheel switching *R & Eng* * Nov, Dec -**91**

BRAKE gear diags., Am. Brake Co., cor. *E News* * Jan 26-**89**

BRISTOL & Exeter express *The Eng* * May 9, 9-**90**

BUILDING, Am., '88, n *Eng* Mar 8-**89**; in New So. Wales, June 6-**90**; in '89 *E News* Feb 1; 40 years' course of, French, inset *The Eng* * June 20, July 18-**90**

CAB, Balt. & Ohio *R Gaz* * Dec 16-**92**

CALEDONIAN R. bogie pass. *The Eng* Apr 13, 13-**88**; No. 123, performance, diags. * Mar 13-**91**

CANADIAN Pac. 10-wheel heavy pass., inset *Eng* * Jan 17, inset *E News* * Aug 30-**90**; mogul, inset *R Gaz* * May 31, inset *The Eng* * June 21-**89**

CAPE Gov't. R's, coal burning of Colonial coal on, Stephens, insets *Inst M E* * Jan -**90**

CAVAN R., light locom. *The Eng* Apr 20, 20-**88**

Locomotives, CHESAPEAKE & O. 10-wheel pass., Rogers works *R & Eng* * July -**90**; tank switching, 2500 gals. *R Gaz* * July 27-**88**

CHICAGO, Bur. & Q. pass., inset *E News* * June 28; standard mogul * July 5-**90**; suburb. pass., inset, ed. *R Gaz* * Dec 13-**89**; 75-ton decapod, Rogers works, inset * July 24-**91**

CHICAGO, Mil. & St. P. express *R Gaz* * Feb 20, details * Mar 6-**91**

CLEVELAND, Cincin. Chic. & St. L. *R Gaz* * Jan 1-**92**

COALING chutes *R Gaz* * Dec 11, 18-**91**; coaling stations, Berg, Feb 5 * 19-**92**

COMPOUND *Eng* E. Worthington, Jan 11; Lapage * Mar 22, 29 * Apr 5-**89**; English pats. on, abs., Feb 27, Apr 17-**91**; Sinclair *E News* Apr 20; Am. * Nov 30-**89**; Am. Master Mech's com. report, and ed. June 28, 28-**90**

E & Min compounding petrol. refuse burning, Russia, Urquhart, abs. Sep 14-**89**, insets, discuss. (full) *Inst M E* * Jan -**90**; Lapage, discuss., insets * Jan -**89**; the compound principle applied to, E. Worthington, insets *Inst C E* * v 96-**89**; Polonceau, n v 99 -**90**; Brueckmann, abs. v 104 -**91**, *Soc Ing Civils* Oct -**90**; relative value of different types, abs. *Inst C E* v 106 -**91**, *Am Mas Mech* 24th report

R & Eng 4-cyl., Bousquet, and ed. * Mar -**89**; Master Mech's com. report, July -**90**; development of compound system, Mallet (full), Feb, ed. * Mar – June -**91**; Webb, Jan; early description, n * June, ed. Sep -**92**, *F Inst*

R Gaz in Am. service, ed. * Feb 15, 22; Sinclair, N. E. R. Club discuss. Apr 19; May 10; starting power of, Neale, cor. Aug 16; Barnes, discuss. Oct 18: India, Hughes * Nov 22; ed. * Dec 20-**89**; mathematics of, French, Mar 7; Polonceaux, Apr 18; Master Mech's com. report, June 27; early, Perry & Lay * Sep 19-**90**

R Gaz pats. on (list), Feb 13, English * 20; braking power of steam cyls. of * Apr 3; relative value of different types, Master Mech's discuss. * June 26; cyl. proportions, Oct 2; U. S., table, Dec 18-**91**; in frt. and pass. service, Woods, Jan 1; trip-expan. n May 13; three-cyl. * Dec 30; Master Mech's com. report, abs. July 1, (full) *Ry Age* sup. June 24-**92**

Sc Am Sup compound prin. applied to locoms., E. Worthington, Mar 30-**89**; steam distrib. in, Snow * May 10-**90**, *R Mas Mech;* comp. prin., Worthington *The Eng* Jan 25-**89**; cyls., Harrison, cor. * June 6-**90**; Rickie, cor. Oct 23-**91**

Locomotives, COMPOUND, ARGENTINE Great Western, burning liquid fuel *The Eng* * May 15-**91**
ARGENTINE Midland R. *The Eng* * Dec 27, 27-**89**
AUSTRALIA, Baldwin, tests of Vauclain (full) *R Gaz* May 29 * Aug 7-**91**
BALDWIN four-cyl. and ed. *R Gaz* * May 2, 2-**90**; * May 1, table, Nov 27-**91**. See also LOCOMS., comp., Balt.
BALTIMORE & O., Baldwin, details, inset *E News* * May 3, 3, tests of and ed. Sep 6 * 13, 13, narrow-gauge * Dec 13; tests, Barrus (full), and eds. Sep 12, 12, 19 *The Eng* * Sep 19, 26 -**90**
BATCHELLER'S pat. valve *R & Eng* * May; R. I. Locom. works, Franklin Inst. medal *R Gaz* June 3-**92**
BROOKS two-cyl. *R Gaz* * Nov 25-**92**
CHICAGO Mil. and St. P. tests, inset *R Gaz* * Aug 5, 5-**92**
DEAN'S *R Gaz* * Nov 25-**92**
EAST Tenn. Vir. & Ga. indic. diag. *E News* * Nov 22-**90**; ten months' test of, Dec 5-**91**
FRENCH *R & Eng* * Aug -**89**; recent *R Gaz* * Jan 3-**90**
GERMANY, in, Stambke *E News* * Apr 19, May 3-**90**
GRAZI-Tsaritsin R. goods, petrol. refuse, Urquhart *The Eng* * Jan 31-**90**
HUNGARIAN State R's *E News* * Feb 6-**92**
JOHNSTONE'S double truck, Mex. Cen. *E News* * Aug 29-**91** * Mar 12-**92**; abs. *Inst C E* v 106 -**91**; Mex. Cen., tests (full) *R Gaz* * May 22, 29, Oct 9; 10-wheel, inset * June 5; trials anal., cor. Sep 25-**91**; double bogie, Mex. Cen., inset * Mar 25, test * Aug 26 (full) * Dec 30, 30-**92**. See also LOCOMS., comp., Mex. Cen.
LAKE Shore & Mich. So. frt. *R & Eng* * Dec -**92**
LINDNER'S starting gear, system for *E News* * June 16, do. *R & Eng* * Dec -**92**, do. *R Gaz* * Nov 15-**89**; do. in Russia * Mar 13, 27-**91** * Sep 2-**92** *The Eng* * May 23-**90**
LONDON & No. W., Edinb. exhib., inset *Eng* * July 25-**90**; Webb's, with Joy valve gear *E News* * Jan 26-**89**; frt. *R & Eng* * Feb; Webb's *The Eng* Dec 21, 21-**88**
MALLET'S, Decauville R., Paris exhib. *Eng* * May 3, do. *E News* * June 1-**89**; largest and smallest *R Gaz* * Aug 15-**90**; prog. in use of * Feb 6, arguments pro and con, Polonceau, 13-**91**, *Ing Civils;* Paris exhib. *The Eng* * May 24 -**89**

Locomotives, COMPOUND, MEYER-Lindner duplex, Roy. Saxon St. R. *R Gaz* * Sep 2-**92**

MEXICAN Cen. 10-wheel Johnstone's double truck, inset *E News* * Aug 29-**91** * Mar 12, inset (full) * 26 * Apr 2, valve motion * 9-**92**; Johnstone, tests *R & Eng* * June, n Aug -**91**, Nov -**92**, do. *R Gaz* May 29, Oct 9-**91**, test * Aug 26-**92**

MEXICAN National R., dimens., news n *E News* Dec 13 -**90**

MICHIGAN Cen., Schenec. works *Eng* * Apr 4-**90** *E News* Jan 25, and ed. * Mar 8-**90**; ed. *R Gaz* * Jan 31, ed. Feb 14-**90**; 10-wheel pass. * Jan 23-**91**

MISSOURI, Kan & Tex., and simple, comparative tests *R Gaz* Nov 11-**92**

NORTH Eastern R., England, express, Worsdell, inset *Eng* * Mar 30 * Apr 13-**88** * June 21, 21-**89**; pass do. *R & Eng* * May -**90**; tank engine *The Eng* Oct 26, 26, goods tank, Nov 23, 23-**88**; express, inset * Feb 28 * Mar 7-**90**

NORTHERN R. of France, goods, Paris exhib., inset *Eng* * Dec 6-**89**; 4-cyl. fast pass., Bousquet, n *R & Eng* Jan * Aug *R Gaz* * Aug 12 *The Eng* * Sep 2-**92**

PARIS, Lyons & Med. R. *The Eng* * Aug 9-**89**

'PENN,' the *R Gaz* * May 3-**89**

PITKIN'S pat. *R & Eng* * Mar -**90**

PRUSSIAN State R's, goods, Worsdell system, inset *Eng* * Feb 1-**89**

RHODE Is. Locom. works, com. report, insets (very full) *F Inst* * May -**92**; Batcheller, bk. review *R & Eng* Jan -**91**; test in express service, Jan -**92**; and simple, study of, expts. *R Gaz* * Jan 9; system of (full) * Dec 11-**91**

RUSSIA, petrol. fuel, Urquhart *Eng* Feb 7 * 21 * Mar 7, do. *E News* * June 14-**90**

ST. Gothard R., duplex *E News* * Aug 15-**91**

ST. Petersburg & Warsaw R., pass., inset *Eng* * Sep 9, *R & Eng* * Nov -**92**

SAXON State R's express, dimens. *R Gaz* * Nov 22, 29-**89**

SOUTHERN Pac. *E News* * Apr 28-**92**; 10-wheel, inset *R Gaz* * Sep 11 **91**

SWISS, Jura-Berne-Lucerne R., pass. mogul, inset *Eng* * Feb 7; *R Gaz* * Sep 12-**90**

TESTS, Baldwin, Balt. & O. and ed. *E News* * Sep 6, 13, 13; Union Fl. R., Brooklyn, in fast pass. service, Dec 27-**90**

Locomotives, COMPOUND, TESTS

* Jan 3; 10 months, E. Tenn. Vir. & Ga. Dec 5, 12-**91**; Vauclain * June 23, ed. 30, 30, indic. diag. * July 7-**92**; Johnstone, Mex. Cen. *R & Eng* * June * Aug; W. N. Y. & Pa. R. Oct -**91**; R. I. works, in express service, Jan; Johnstone, Mex. Cen. Nov -**92**

R Gaz B. & O., Barrus, (full) Sep 12, 19-**90**; R. I. works expts. * Jan 9; Johnstone's (full) * May 22; Vauclain, May 29, * Aug 7; Johnstone, trials anal., cor. Sep 25; and simple, comparative, W. N. Y. & Pa. Oct 2, Baldwin, Mex. Nat. Dec 4-**91**; Johnstone, Mex. Cen. * Aug 26; and simple, comparative, Mo. Kan. & Tex. Nov 11-**92**; comparative, Hudson *Sc Am Sup* Jan 23-**92**, *J Assoc E Socs;* B. & O. *The Eng* * Sep 19, 26-**90**

VALVE gear, variable expansion, Dunlop, cor. *Eng* * Feb 13-**91**; for Hope & Co., cor. *R Gaz* Sep 19-**90**

VAUCLAIN, 4-cyl. *E News* * May 3-**90** * Feb 20; tests * June 23, ed. 30, 30, indic. diags. * July 7-**92**; com. report *F Inst* * July -**91**; patent, n *R & Eng* Jan -**90**; tests *R Gaz* May 29, Australia, Baldwin, tests * Aug 7-**91**; Manitou & Pike's Peak rack R., n * Aug 12-**92**

VON Borries', starting valve for (full) *R Gaz* * June 12-**91**. See also LOCOMS., comp., Worsdell & Borries

WEBB'S, Lond. & N. W., with Joy valve gear *E News* * Jan 26, *Eng* * June 7-**89**, *The Eng* Dec 21, 21-**88**

WOOLFE 4-cyl. double-expan., ed. (full) *R Gaz* * Mar 8, 8 -**89**

WORSDELL, N. E. R. express, inset *Eng* * Mar 30 * Apr 13-**88**; Worsdell & Borries' system, goods, Prussian State R's, inset * Feb 1; N. E. R. express, inset * June 21, 21-**89**, do. *R & Eng* * May -**90**; applic. to Am. type of locom. *R Gaz* * Dec 14-**88**; Grand Trunk R. * Nov 6-**91**; Bengal R. *The Eng* July 20-**88**

WRIGHT'S *R Gaz* * Jan 30-**91**

COMPRESSED air, 40 and 50 ton, Mekarski system, for Paris, France *E News* * May 31-**90**. See also STREET railroads, compressed air motors

CONNECTING rods, side rods, N. W. R. Club discuss. *R Gaz* Nov 21-**90**; and crank pins, Chic. B. & Q. R. * Jan 16-**91**; parallel rod resistance, Apr 8-**92**; *The Eng* May 25, June 22-**88**

Locomotives, COUNTERBALANCING, recip. parts, Lanza *Am M E* * v 10-**89**; W. H. Lewis *E News* * Apr 26-**90**; eds. *R & Eng* * Feb - Apr -**90**; Hill *Inst C E* * v 104 -**91**; Lanza *R Gaz* * Oct 19-**88**; Booth, cor. * Oct 11-**89**; in 3-cyl. compound, cor. and ed. * Mar 21, review of, 21, Booth, cor. and ed., Apr 4; W. H. Lewis * 25; Western R. club discuss. May 30-**90**, Barr discuss. do. * Mar 6-**91**; expts. on methods, Lanza *Tech Q* * Feb-**89**

CRANK-pin turning machine, Urquhart *Eng* * Apr 12: at Paris exhib. * Sep 27-**89**

CRANK shaft, expts. with, Ivatt *R & Eng* * July -**91**, steel, test of, do. *The Eng* * Apr 3-**91**

CYLINDER cock, Riggin's combination *R Gaz* * July 4-**90**

CYLINDERS, design, Barker, inset *Inst C E* * v 106 -**91**; steam action in at high speeds, ed. *R Gaz* Nov 22-**89**; proper capacity for pushers on grades, ed. * Dec 19-**90**; means for increasing power at speed, ed. Oct 23-**91**; and slide valves, Lond. Br. & So. C. *The Eng* Aug 23-**89**

DELAWARE, Lack. & W. mogul frt. *R Gaz* * Feb 3-**88**

DOUBLE end saddle tank, Porter *R Gaz* * June 14-**89**

DOWNWARD draft, Complete Combustion Co. *E News* * Aug 2 -**90**

DRIVING-box linings, opinions, table *R Gaz* Mar 28-**90**

DRIVING-wheels, 'imperceptible slip,' Sargeant, C. B. & Q., tests of, table *E News* June 14; ap. for removing paint from, Horton * Oct 11-**90**; Vauclain's centers, com. report *F Inst* * July -**91**; big *R & Eng* Nov -**92**; size of express, ed. *R Gaz* Oct 26-**88**; 7½-ft. cast steel, N. E. R., England * Mar 7-**90**; Vauclain's wrt. iron centers * July 10-**91**; best size of, Greenhill *The Eng* Mar 29-**89**; polygonal * Apr 4-**90**

DRIVING-wheel tires, Bess. steel, Arnold *Eng* Dec 7-**88**; wear of, cyl. wheels and flat-topped rails, Whittemore *E News* * Feb 9, and ed. 16, 16, 23, ed. Mar 2; tests, Mich. Cen. * May 11-**89**; retaining ring for * July 19; hollow, dangers of in contact with frog points, Perry * 26; breakages in Germany, Aug 9; steel, and attaching do. with different fastenings, Rhodes, Nov 8 * Dec 6-**90**; irreg. wear of, Barr * Feb 7-**91**, do., Herr * June 16-**92**

Inst C E and rails wear on curves, Helmholtz, abs. v 93-**88**; Bess. steel, influence of chem. composition on strength, Arnold, discuss. * v 95 -**89**; oil-gas tire setting ap., G. T. R., Wanklyn,

Locomotives, DRIVING-wheel tires
abs. v 104 -**91**; and axle specs., English *R & Eng* * Aug; German fastenings * Aug -**91**
R Gaz wear of, table, Master Mech's com. rep. June 22-**88**; steel, influ. chem. compos. on strength, Arnold, Mar 8-**89**; steel and Ross-Meehan shoe, N. E. R. club discuss. Oct 17; steel, attaching to center, Rhodes, Nov 7, fastenings, do. * Dec 5-**90**; irreg. wear of, Barr * Feb 6; wear, flat spots on * Mar 20; steel, tests, Roussel * Apr 3-**91**; stresses in, cor. Jan 22; irreg. wear of, Barr * June 17; shrinkage of, table, July 15; wear, Herr, discuss. * Oct 21-**92**

EASTERN R. of France, tank, Paris exhib., inset *Eng* * Aug 30 * Sep 20-**89**; Flaman boiler (compound), inset * Mar 25 * Apr 8, 22; fast *R & Eng* * Mar -**92**; express experimental *The Eng* * Nov 13-**91**; double-boiler express, inset * Mar 4, 11 -**92**

ELECTRIC, Manhattan Elevated R., and steam, comparative tests, Moss, insets *Am C E* * v 23-**90**; A. Siemens *El Rev Lond* * Aug 12, do. results, City & So. Lond. R. *Eng* * Aug 19, do. *E & Min* * Sep 3-**92**; and steam, compar. tests, effic., Moss *E Rec* July 19, do. *The Eng* Aug 29, do. and ed. (full) *R Gaz* * July 11, Moss, cor. 18-**90**; Weem's high speed, expts., Crosby (full) Mar 13-**91**; as substitutes for steam locoms., Woods, June 24-**92**; Daft, trial, N. Y. El. R. *Sc Am Sup* * Mar 2-**89**

ENGINE drivers, hours of *Eng* Jan 30-**91**

ENGLISH, and Am. and ed. *E News* Aug 2, 2, discuss. Oct 11-**90**; use of truck on *R & Eng* * Aug; express, Paris exhib. * Nov -**89** *The Eng*. See also LOCOMS., Am. and English—erecting

ERECTING *Eng* * Dec 18-**91**; English *R Gaz* * Sep 28; at Altoona *The Eng* Sep 28-**88**

ESTRADE's high-speed, Paris *Sc Am Sup* * Apr 28 *The Eng* Mar 9, 9-**88**

EXHAUST, nozzle, Macallan's variable *Eng* * Aug 22-**90**; muffler, Penn. R. *E News* * July 21-**88**; pipe, Smith's triple-expan. Mar 16-**89**; pipes, nozzles, etc., Am. R. Master Mech's report * June 20-**91**; nozzles, single and double, ed. *R Gaz* * May 16 -**90**; pipes report * June 19; nozzle, Mertsheimer's variable * July 31-**91**; ap., common sense about, ed. * June 17-**92**

FAIRLIE system, Mex. Cen., inset *Eng* * Mar 14-**90**

Locomotives, FEED water heater and purifier, Barnes' *E News* * Aug 9 *R Gaz* * July 25-**90**; purification, Northwest R. club discuss., C. N. Hunt, Dec 13, 20-**89**

FIRE-boxes, brick arches in, Am. R. Master Mech's com. report *E News* Aug 9-**90.** See also LOCOMS., boilers, fire-boxes

FIRE extinguisher, Penn. R. *R Gaz* * July 19-**89**

FREIGHT, hauling capacities, table *R Gaz* Nov 21-**90**

FRENCH, Paris exhib. *R & Eng* * Nov, pass. * Dec -**89**; tank * Feb -**90** *Eng*; notes *R Gaz* * Jan 16, 23-**91**; Chemin de fer d l'Ouest, express *The Eng* * Oct 4, 11-**89.** See also LOCOMS., Eastern R. of France

FUEL, premiums, Russia, Borodine *R Gaz* Sep 27-**89**; Yates' mileage card, Aug 1-**90**; petroleum, liquid fuel on *Eng* * Oct 19-**88,** working of, Urquhart * Feb 8, 15-**89,** do. tests *E News* * Feb 2-**89,** burning * Aug 25-**92,** do. Dudley *F Inst* * Aug -**88,** in So. E. Russia, Grazi & Tsaritsin R., Urquhart, discuss., insets *Inst M E* * Jan -**89** *R & Eng* * Jan -**89,** on Great Eastern R., England, Booth *R Gaz* * Feb 26-**92** *Sc Am Sup* * Nov 24-**88,** working with, Urquhart (full) * Sep 27 * Oct 4-**90.** See also LOCOMS., boilers, liquid fuel

FURNACE coal burning, Higginson *R Gaz* * Nov 23-**88.** See also LOCOMS., boilers, fire-boxes

GEORGIA Pac., 10-wheel *E News* * Apr 5-**90**

GLASGOW & So. West., pass., inset *The Eng* * Mar 1, 22 -**89**

GRAND Central R., Belgium, tank, inset *Eng* * Aug 16-**89**

GRAND Trunk of Canada, express, inset *Eng* * Dec 14, 21-**88** *Sc Am Sup* * Feb 16-**89**

GRANT works, Chic. *R Gaz* * May 15-**91,** Cicero, Ill., inset * June 17-**92**

GRAZI-Tsaritsin R., So. E. Russia, 8-wheel *The Eng* * Sep 4, 11, 11-**91**

GREAT Britain and Ireland, number *The Eng* Sep 2-**92**

GREAT Eastern R., England, express, inset *Eng* * May 4-**88,** inset * May 27-**92,** *The Eng* * June 12-**91**

GREAT Northern R., England, express *The Eng* June 8-**88** * Nov 6-**91,** insets * Dec 16, 16-**92**; of Scotland, pass., inset *Eng* * May 23-**90**

GREAT Western, England, broad and narrow gauge convertible, inset *Eng* * July 8-**92**; works, Swindon *The Eng* Nov 16-**88**; early * May 20, 27-**92**

Locomotives, HEADLIGHT, elec., Pyle's *El Wld* * Sep 27-**90,** abs. *Inst C E* v 103 -**91**; elec. *R Gaz* Nov 29-**89,** Jan 17-**90**

HIGHLAND R., Scot., standard pass., inset *Eng* * Oct 9 *R & Eng* * Dec -**91**

HISTORY, the DeWitt Clinton, G. H. Thomson, inset *Am C E* * v 23-**90**; old, the 'Sampson,' Robb *Am M E* v 10 -**89**; early, see H. Allen, v 11 -**90**; early, the steam buggy *E News* * Sep 8-**88**; early, Horatio Allen * Jan 11; the John Bull * 18; hist. of development, ed. 18-**90**; Tomlinson, Pres. addr., insets, (full) *Inst M E* * May -**90**

R & Eng * Feb - Apr -**90**; Camden & Amboy R., Norris, n * Jan -**92**; hist. of articulated, Brunner *R Gaz* Sep 25-**91** *Zeit Deut Eisenbahn;* early, Am. type and equalizing lever, Eastwick *R Gaz* * Apr 22, 29-**92**; the rail, spike and locom., Watkins *Sc Am Sup* Dec 12-**91** *The Eng* * Mar 7-**90**

HOELLENTHAL R., inset *Eng* * Feb 6-**91**

HOIST, Chic. & No. W. *R Gaz* * Feb 5-**92**

HUNGARIAN State R's, tank *The Eng* Feb 3, 10-**88**

ILLINOIS Cen. suburban, tests (full) *R Gaz* * June 17-**92**

INDIA, Sind Pishin section, Indian State R's *Eng* Apr 13 * 20-**88,** inset * Apr 19-**89,** 6-coupled, meter gauge *The Eng* Mar 23-**88**; Indian Midland tank * Nov 22-**89**

INDICATOR diags. at high speeds *E News* * June 9, compound and ordinary, comparison * July 7-**92**; indicating. Lyne, *R Gaz* * Aug 2, Manning, cor. 16-**89,** do. Dean * Feb 28; indicator cock, 4-way, Gifford * Mar 7; diags., Worsdell's high speed compound * Mar 28, No. E. R., England and ed. (and train resistance) 28-**90**

IRON Range & Huron Bay heavy frt. *E News* * June 16, 12-wheel, inset * July 7-**92**

ITALIAN pass. *R & Eng* * June -**90**; Ital. Med. R. *The Eng* Nov 9-**88,** pass. * Feb 1 * Mar 29, goods, Sep 6 * Dec 20-**89,** Paris exhib. * Feb 21-**90**

JAPAN Imperial R's tank, inset *Eng* * Feb 10-**88**

LAKE Shore & Mich. So. express, Brooks works (details), inset (full) *R Gaz* * Nov 16-**88**

LANCASHIRE & Yorkshire, England, pass., inset *E News* * Mar 28; 6-wheel frt. *R Gaz* * Jan 30; tender water-scoop * Dec 25-**91**; standard goods, inset *The Eng* * Jan 1-**92**

LONDON, Brighton & So. Coast pass. *R & Eng* Sep, express pass., Paris exhib. *The Eng* July 19, 19-**89**

Locomotives, LONDON & No. W., Crampton engine, 1847, inset *The Eng* * Nov 28-**90**; compound express * Nov 20-**91**
LONDON & So. W. works *The Eng* Sep 28-**88**; tank, inset * Feb 5-**92**
LONDON, Tilbury & So. tank *The Eng* * Nov 25-**92**
MANHATTAN Elevated R., N. Y. n *R & Eng* * Jan -**90**
MEDITERRANEAN R. *The Eng* * Mar 13-**91**
METROPOLITAN R., Lond., 4-wheel tank, inset *Eng* * Dec 18-**91**; Met. Dist. R. pass. tank *E News* * Mar 22-**90**, inset *The Eng* * May 17-**89**
MEXICAN Cen. (Fairlie system), inset *Eng* * May 14-**90**; average econ., Johnstone, cor. *R Gaz* Nov 20-**91**
MICHIGAN Cen. 10-wheel express *R Gaz* * Feb 24-**88**
MIDLAND R., England, express, inset *Eng* * Mar 2, 16-**88**, exp. pass., Paris exhib. *The Eng* Sep 20-**89**
MINERAL tank, Barry R. *Eng* * Dec 2-**92**
MOUNTAIN, two rack-rail, Abt system, Brunig R. and Riggenbach system, Brazil *E News* * Nov 9-**89**. See also RAILROADS, mountain
NARROW gauge frt., for So. Am. (meter gauge), Sharp Stewart, Glasgow *E News* * May 17; compound, Baldwin * Dec 13 -**90**
NEWPORT News & Miss. Val. 10-wheel frt. *R Gaz* * Mar 16-**88**
NEW So. Wales Gov't. R's, Baldwin 10-wheel *R Gaz* * May 29-**91** *The Eng* Nov 23-**88** (full), July 1, Oct 14-**92**
NEW York Cen. & H. R. 19 x 26 Brooks mogul, inset *R Gaz* * July 25-**90**; suburban, inset * Sep 11-**91**
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OLD Colony R., simple and compound, tests, tables *R Gaz* Sep 16-**92**; pass., inset *The Eng* * Nov 14-**90**
OSCILLATIONS ap., West. R. of France *Eng* * Jan 10; registering ap. *E News* * Feb 8-**90**
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Locomotives, PHILADELPHIA & Reading heavy consol. *R Gaz* * Jan 4-**89**; express * Apr 15-**92**
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RAUB, the, n *The Eng* Dec 7-**88**
RESISTANCE, engine and ed. *E News* Jan 5, 5-**89**
REVERSE lever, Cumb. & Pa. R. *R Gaz* * May 23-**90**
RICHMOND works *R & Eng* * Oct -**90**
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ST. Gall & Garis mt. road R., Switz., inset *Eng* * Dec 30, 30-**92**
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SAXON State R., 4-cyl. compound *The Eng* * Oct 23-**91**
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SHAY, the, Gilpin Tramway, Col. *E News* * Apr 26-**90**, inset *R Gaz* May 8-**91**
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89 *F Inst* * Feb -**88**; steam distrib., Dean *R Gaz* May 25-**88**; the 'A. G. Darwin,' inset * Jan 11; indic. diags. June 28 * July 26-**89** *Sci Am* Jan 12-**89**; insets * *Soc Arts Mass* -**88**; Tratman *The Eng* Sep 13-**89**
SWEDISH pass. *R & Eng* * May -**88**
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TAFF Vale R. 10-wheel tank pass., inset *Eng* * Aug 2, 9-**89**
TENDERS, Wabash R. *E News* * Dec 1-**92**; truck, U. P. standard *R Gaz* * Dec 7-**88**; axles, muck-bar, tests, Watertown arsenal, Howard (full) Jan 4; trucks, Hickey, Feb 22, Mar 1-**89**; iron frame, N. Y. L. Erie & W. * Apr 18; heavy axles, Master Mech's com. report * June 20; iron frame, Brooks works * Nov 7-**90**; hopper, Wabash R. * Nov 18-**92**
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R Gaz trials, Manning * July 12, 19; in Chili, Stillman, Dec 27-**89**; standard method, Dean * June 20, 27; testing, Manning, July 18; the calorimeter in testing, Barrus * Oct 17-**90**; Baldwin 10-wheel, B. & O., ed. (full) * Nov 27, 27 * Dec 11-**91**
R Gaz Old Colony, table, May 27; standard, com. report (full) 27; Ill. Cen. suburban (full) * June 17; simple and compound, O. Col., tables, Sep 16; Schenec. prelim. Oct 7-**92**; Am. performance, n *The Eng* Apr 20-**88**; trials, Chili, Feb 14 -**90**; experimental, Goss * June 3-**92**. See also LOCOMS., compound; RAILROADS, speed
TIRE testing machine, Chapelle works, Paris *The Eng* Jan 6 -**88**
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WESTERN R. of France, Paris exhib. *Eng* * Oct 18; tank * Nov 22-**89**; pass., inset * June 6, 13-**90**
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Lock, Havre transatlantic, iron gates, Widmer, abs. *Inst C E* v 92 -**88** *An Ponts* * v 14 -**87.** See also CANALS, locks
Lock-nut, the Cluther *The Eng* Sep 28-**88.** See also TRACK, lock-nuts
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Lockwood, Thomas D., por. *El Wld* * Sep 14-**89**
Lodge, Oliver J., por. *El Wld* * May 9-**91,** por. *Sc Am Sup* * Nov 1-**90**
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London, elec. lighting of, ed. *Eng* May 24-**89**; growth, *E News* Aug 15-**85**; July 22-**88**; water Co's remarkable hist. Aug. 17-**89**; street traffic, July 5; smoke, value of, n Dec 6-**90**; traffic, Howe report sup. Jan 2; Met. Gov't., ed. Apr 21; rapid transit * Nov 24-**92,** do., Reckenzaun *St R J* May -**91**; main drainage report *The Eng* Mar 13-**91**; new streets between Holborn and Strand, proposed, map * July 15-**92.** See also HYDRAULIC power distrib., Lond; PAVEMENTS; RAILROADS, underground; SEWERS; WATER-works, etc.
Loring, Charles A., por. *Cassier's* * Dec -**91**
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Lubbock, John, por. *Sc Am Sup* * Mar 22-**90**

Lubrication, viscosity, dets. of, Denton *Am M E* v 9-**88,** measurement of durability of lubricants, do. * v 11-**90,** expts. with, do., Bissell, v 12-**91,** self-lubricating fibre graphite for machinery bearings, Cooper, v 13-**92;** friction of, Thurston *Cassier's* Oct-**92;** J. V. Wilson *Eng* * Apr 20-**88;** anti-friction materials, Hedges, Aug 26-**92;** dry lubricants *E & Min* Aug 24-**89;** lubricating oil purifier *E News* * June 21-**90;** the Holmes lubricant bearing, com. report *F Inst* Dec-**91;** measurement of durabil., Denton *Pwr* * June; lub. oils exam., Stillman, Sep-**90** *Steven's Indic;* durabil. of lubricants, Denton *R Gaz* May 23-**90;** rationale of, Snowden, Feb 13-**91;** Barr, Dec 2-**92;** lub. oils, Charlier *Sc Am Sup* Nov 29 *The Eng* Oct 17-**90;** oils, ed. Sep 18-**91.** See also BEARINGS without lubs; FRICTION and lub; GREASE; OILS

Luiz, Dom I (King of Portugal) *Inst C E* v 100-**90**

Lumber, creosote, Fernandina works, Fla. *R Gaz* * Nov 16-**88;** No. western traffic, Mar 25-**92;** cutting, circular saw or band, n *Sc Am Sup* * Oct 25-**90.** See also WOOD

Lunkenheimer, Frederick, por. *Cassier's* * Jan-**92**

Lunn, Robert W. *Inst C E* v 100-**90**

Lyons, John *Inst C E* v 101-**90**

Machine, moulding, Tabor *Am M E* * v 13-**92** *Cassier's* * July; design, æsthetics in, Barr, Aug-**92;** design, Unwin, bk. review *Eng* Apr 24-**91;** designing, intuition in, Hawkins *E Mag* July-**92,** do. *The Eng* Feb 15, 22-**89;** designing, Sweet *F Inst* * Apr, do. *R Gaz* * June 15, do. *Sc Am Sup* * Apr 28 * May 5-**88;** accident preventing devices, Cooper *Pwr* * Dec-**90** *Am M E* v 12-**91;** construction, Richards, bk. review *R & Eng* Nov-**89**

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TOOLS, mod., Dixon *Eng* Feb 3 *The Eng* Jan 20-**88;** power used by, n *E News* July 19-**90;** indic. diags. from, Breckenridge *Lehigh Eng J* Oct-**88.** See also Shipyard machine tools, etc.

Machinery, The Mechanics of, Kennedy, bk; tight set-screws in, Cooper, discuss. *Am M E* -**88**; miscel., Roy. Agric. Show, Nottingham *The Eng* July 20; use of in construction, Price, Oct 26; sale of old, Sharp, Stewart & Co. 26-**88**; old, sale prices, July 19-**89**

Machines, accident preventing devices applied to, Cooper *Am M E* v 12 -**91** *Pwr* * Dec -**90.** See also AUTOMATIC—SLOT machines

Mackensie, John *Inst C E* v 106 -**91**

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Macy, Arthur, por. *E & Min* * May 9-**91**

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Magic lantern, optical projection, Wright, bk. review *Eng* Dec 4 *The Eng* * Nov 13 * Dec 25-**91**

Magnesite as a refractory material, Sorge *E & Min* Jan 16 -**88**

Magnetic, circuits and measurements, Du Bois *El Rev Lond* * Oct 9; induction, molecular proc. in, Ewing (full) *Sc Am Sup* * Nov 14; reluctance, Kennelly (full) *El Wld* * Nov 7, discuss. 21, (full) *El Rev* * Nov 7-**91**; fields, graphic representations, Houston * Sep 3-**92.** See also ELEC. magnetic

SEPARATORS *E & Min* * Nov 5-**92**; Paris exhib., Hering *F Inst* * June; Hall, cor. *The Eng* * July 18-**90**

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LOVETT-Finney iron ore *E & Min* * Nov 21-**91**

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Magnetite, crystalline, in Port Henry, N. Y. mines, Birkinbine *Am Min* * v 18-**90**; Ontaria, Ledyard, discuss. v 20, So. W. Va., Nitze, v 20 -**92**; concentrating with Conkling jig at Lyon Mt., N. Y., Ruttmann *E & Min* * June 9-**88**

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Magnolia metal for machine bearings, R. H. Smith report *The Eng* * Dec 20-**89**

Main, John F. *Inst C E* v 110 -**92**

Malaria, malarious districts, treatment of *Eng* * Mar 2-**88**; Celli *Sc Am Sup* * June 27-**91**

Malt drying vac. stove *Sc Am Sup* * June 30-**88**

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Manganese, manganese-steel, Howe *Am M E* * v 12-**91** *E News* * June 20-**91**; ores, argentiferous, Tombstone dist., Ariz., Goodale (supplementary) * v 18 -**90**; ore deposits, Crimora, Va., Hall *Am Min* * v 20-**92**; steel *El Rev Lond* Aug 10, do. Hadfield *Eng* Mar 9, Sep 7, 21-**88**

E & Min Santiago de Cuba mines, Reimer report, Nov 24-**88**; the Reymert manganiferous lode, Ariz., Blauvelt, Feb 9-**89**; the Crimora mine, Va. * Mar 22-**90**; ores, U. S. produc., Weeks, Cen. bull. May 23; distrib. in No. Am., Penrose, Aug 1 -**91**; metallic, Bullock, n *F Inst* July -**89**; bronze *The Eng* * July 25-**90**

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Maps, in relief, construct., Harden *Am Min* * v 16-**88**; mercator chart drawing on one sheet, Kelvin *El Rev Lond* * Sep 30-**92**; of ordnance survey, Scot. Highlands *Eng* Jan 6, 20 * Feb 3, 17 * Mar 2, 16, 30 * Apr 13, 27 * May * June 1, 15, 29-**88**; pocket mapping instrum., Lane *E & Min* * Apr 12-**90**

E News plotting contours, Lorimi, diag., cor. * Feb 23; making topog. relief maps, cor. 23-**89**; Gov't., scale of, in Europe, n Dec 19-**91**; topog. lettering and marking ap., n Feb 6-**92**; mapping of the world *R & Eng* June -**91.** See also MINING maps; SURVEYING, topog.

Marble quarrying, U. S., Morse *E Mag* Oct -**91.** See also RAILROADS, Carrara-Marble District

Marillier, James C. *Inst C E* v 102 -**90**

Marine engineering, development and prog. during past 15 years, Seaton *Am Min* v 19 -**91**; *Eng* Nov 14-**90,** Jan 16-**91**; submarine gullies, Webb *El Rev Lond* Feb 24; concrete for marine constructions *Eng* July 20-**88**; some details in, Mudd, Apr 10 *The Eng* * Apr 10; eng. during last decade, Blechynden, July 31, Aug 7, insets (full) *Inst M E* * July *Sc Am Sup* Sep 19, 26 *Eng* July 31 * Aug 21, Sep 18; practice 40 years ago, Denny, June 26-**91**; and ship-building in '92, Dec 23-**92**

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BOILERS, Babcock *Cassier's* * Jan -**92**; working and test pressures, Sennett *Eng* Mar 30 *The Eng* Mar 30-**88**; corrosion, Dodds, May 3 *Eng* Mar 29-**89**; double shell, Casebourne, Jan

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ALFONSO XII str., inset *Eng* * Feb 15 * Mar 1-**89**
ALMY water-tube, Normand's *Cassier's* * Sep *R & Eng* * July -**92**
AUSTRALIA, Am. Pacific str. *The Eng* July 19-**89**
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BARHAM and Bellona S. S., insets *Eng* * Nov 28 * Dec 12, 12-**90**
CARSON, the, n *R & Eng* * May -**91**
CALORIC str., compound *Eng* * Aug 23-**89**
CITY of Dundee str., inset *The Eng* * Feb 26-**92**
EDGAR, H. M. S. *Eng* * Jan 1-**92**
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GRACE Darling steam yacht *The Eng* Mar 23-**88**
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LIQUID fuel, oil fuel in *E News* Feb 1-**90**; applic. to, Busley, abs. *Inst C E* v 92 -**88**; furnaces for, do. *R & Eng* * Apr-June -**88**
LYNX str., Great Western R., inset *Eng* * June 13-**90**
MAINE, U. S. cruiser, N. Y. navy yard *R & Eng* * July *The Eng* * Apr 25-**90**
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MODJESKA twin-screw str., inset *Eng* * Oct 4-**89**
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Marine BOILERS, RAMILLIES, H. M. battle-ship *Eng* * Aug 12 -**92**

ROSLIN Castle str. *The Eng* Nov 30, 30-**88**

SCOT str. *Eng* * July 3, 10-**91**

SINOPE, Russian ironclad *Eng* * July 18-**90**

TARTAR str. *The Eng* * May 23-**90**

THORNYCROFT water-tube *Eng* Apr 26-**89,** Dec 23-**92,** discuss., insets (full) *Inst C E* * v 99 -**90,** for warships *Sc Am Sup* * June 8 *The Eng* Nov 22-**89**

U. S., cruiser 12 *R & Eng* * Dec -**90**; cruiser 6 *The Eng* * Nov 6-**91**

WATER-gauge fittings, Gray *Eng* Dec 25-**91**

WATER-tube, trials, Loring, abs. *Inst C E* v 104 -**91** *J Am Soc Naval Engr's* -**90.** See also MARINE boilers, Almy — Babcock — Thornycroft

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CABLES, laying, Webb (full) *Sc Am Sup* Apr 19-**90** *El Wld.* See also TELEGRAPH cables

COLLISION apron, the Schultz *E News* Jan 7-**88**; collisions at sea, Barroll (full) *R & Eng* * Sep -**90**

COMPASS, hist., theoretical and practical, Wilson-Barker *El Rev Lond* Apr 8-**92**; the Chase recording and alarm *El Wld* * Jan 18-**90**; mariner's *Locom* Nov -**91**; adjusting at sea *Sc Am Sup* July 26-**90.** See also COMPASS

CONDENSERS, the Yaryan fresh water *Eng* July 26-**89** *Pwr* * Feb-**90**

DISTILLING ap., fresh water *E News* * May 12-**88**

DIVING suit survey, Saunders *E Mag* * July -**91**

ENGINES, triple-expan. *Cassier's* * Dec -**91** * Jan, econ. of * Nov * Dec -**92**; quadruple compound *Eng* * June 1; h. p. of, report, Dec 28-**88**; wt. of, Mar 8; trip-expan. for river str. * Nov 8; 1800 h.p. trip-expan. * Dec 20-**89**; and eng. prog., 15 years, Seaton, Nov 14-**90,** Jan 16-**91** *Am Min* v 19 -**91**; Joy's assistant cyl. for *Eng* * Apr 10; engine room practice, W. Wilson, May 29; Durston, July 31-**91**; steam nav., early hist., Kent *E & Min* Mar 7-**91**; 18,000 h.p. *Locom* May -**89** *The Eng;* trip-expan. on lake strs., Miller *R & Eng* * Jan -**88**; quadruple-expan. * Jan -**90** *Industries*

Sc Am Sup adapt. of steam machin. in marine construction, Emery (full) Jan 18, 25; 15 years' development and eng. prog., Seaton, Oct 25-**90**

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AUXILIARY, on shipboard, W. Allen *Eng* Jan 16, discuss., inset *Inst C E* * v 104 -**91**; str. Violet, inset *The Eng* * Aug 7-**91**
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El Wld gramophone records, Houston, July 14, Berliner's * Aug 18; some possible forms, O. Smith * Sep 8, Hunter, n 22 -**88**; Bettini's micro-graphophone * Apr 26-**90**; Edison's, ed. *Eng* Aug 17 * Sep 14, 14-**88**; expt. * Mar 15-**89**; phonos. and graphophones (full) *E & Min* * Sep 15-**88**

Sc Am Sup Edison's new * Feb 11; and graphophone (full) * Oct 27-**88**; Edison's * July 13-**89**, Johnson, Mar 29-**90**; Larranaga's photo-phon., Maier * Feb 6-**92**; and phon.-graphophone, Vaughan *Soc Arts Mass* -**89**. See also GRAMOPHONE; GRAPHOPHONE

Phosphates, slag, Phillips *Am Min* v 17-**89**; commercial, list of, Adams, v 18-**90**; indus., n *E Mag* Aug *E News* July 18-**91**, of Fla., Wilson, insets *E Mag* * Oct -**92**, do. beds, Ledoux *E & Min* Feb 8, notes, Wyatt, Aug 23-**90**; So. Car. phos. rock market '90, Jan 3; deposits, Fla., notes on geol. of, Darton, Feb 14, do. origin and deposition, Davidson, May 30; of Am., Wyatt, bk. review, Nov 14; Fla. fields, notes, Adams, 21, 28, Dec 5, 12-**91**, do. U. S. produc. '91, Jan 2; Fla., mining, do. * 23 * Feb 13, Pratt, Apr 2; So. Car., mining, Benedict * Mar 26; beds of Maltese Islands, Cooke * Aug 27-**92**

E News indus., n July 18; phosphate of lime produc. July 11 -25-**91**; report, Terne *F Inst* Dec -**92**; beds of Fla., Ledoux *Sc Am Sup* July 12-**90**, deposits, Darton, Mar 14, origin and dep., Davidson, July 25-**91**; So. Car., mining, washing and calcining, Benedict, Apr 16; Fla., Pratt, 30-**92**

Phosphorus, rapid method of det. in ores, Woodbridge *Am Min* v 17-**89**; in pig-iron, steel and iron-ore, C. Jones, in cast iron, Keep, distrib. in Hudson river carbonates, Olmsted * v 18, 18-**90**; the glow of, Thorpe *Sc Am Sup* Aug 9-**90**; manuf. by electricity, Readman-Parker proc. Oct 3-**91** *Chem Tr J*

Photography, of coal mine interior, Dewey, insets *Am Min* * v 16 -**88**; applics. to sci. purposes, Wood *Eng* Mar 30; stereoscopic, Stroh * May 4-**88**; prog., Abney, Oct 4-**89**

F Inst recent advances in, Ives, May; chlorophyl and gelatine-bromide plates, do. * June; substitute for glass, Carbutt, Dec -**88**; heliochromy, Ives, Jan, n Nov; amateur, in its educa-

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tional relations, Himes, May; substitution of gelatine for collodion, com. report, Sep; lenses, focus of, Cheyney * Nov -**89** * June; proc. without metallic salts, Dec -**90**

F Inst in the colors of nature, Ives, Jan; heliochromy, Prof. Lippimann's, do. Aug -**91**; *Locom* Sep -**89**; in natural colors, Feb -**90**; surfaces feebly sensitive to light, Osborne *Sci Am* Jan 19-**89**

Sc Am Sup platinotype proc., Gunther, Jan 21, Willis, May 12; gold and silver salts making, camera, Feb 4; plates, flex. substitutes for * May 5, manuf. * 26 * June 9; stereoscopic * 9; stellar, Holden, July 28; transferring and coloring, on glass, Ashman, Aug 4; negatives, Rau, 11; notes, Sep 8; instantaneous, Howland, Oct 6; notes, 6, 13, objectives, Bausch, Nov 3, 10, Dec 8; printing plates, Nov 17-**88**

Sc Am Sup engraving on glass, Duchochois, Jan 26; the inventors of * Feb 16; lenses, Beck * Mar 30; the law and, Cooper, Apr 20; making dry plate emulsions, Lyon, May 4; orthochromatic, Litzkow, Aug 17; aut. ap. * Dec 21; heliochromy (colored pictures), Oct 5, Ives n *F Inst* Nov -**89**

Sc Am Sup pictures distorting, Wallace, Mar 1; platinotype printing, Mar 1; composite, Batut * Apr 5; a new photographic eye, Flammarion, May 3; ap., Lick observ., Holden * Aug 16; image, Meldola, Sep 13; the Primuline printing proc. Dec 20 -**90**

Sc Am Sup tele-photog. (elec. transmiss. of pictures), Sutton * Jan 24; in colors of nature, Ives * Mar 14; in aniline colors, Green, May 2; aut., Enjalbert ap. * 30; work of Herschel and Fox Talbot, Lang, Aug 15; postage stamp photos. * 15; printing processes, Bothamley, 15; applics. of, Rayleigh * 29; upon a black background * Oct 24, 31; photographic chemistry, Meldola (full) Oct 24, 31, Nov 7; kite * Nov 7-**91**

Sc Am Sup telescope lens, Dallmeyer * Apr 9; notes * May 7; composite heliochromy, Ives (full) July 2; photos. untrustworthiness * Dec 17-**92**; of solar prominences, Hale *Tech Q* Nov -**90**

The Eng Crystal Pal. exhib. Mar 2, 9-**88** * Apr 5, 19 * May 10-**89**; Marion & Co's works, Apr 20, May 4; Swain's photozincographic works, June 8-**88**; B. Edwards & Co's photographic dry plate works * Mar 8-**89**; in natural colors, May 29, June 12; illum. of developing rooms, Aug 14; recent aids

Photography
to science, Sep 18, Oct 9-**91**; Camera Club conference * Mar 25; photos. (distortion) * Nov 4; curious phenomena and applics. Dec 16-**92**. See also CHRONOPHOTOGRAPHY
KINETOGRAPH, the Edison *El Eng* * June 24-**91**, Lathrop *Harper's W*
Photo-etching, intaglio plates, method *Sc Am Sup* Dec 28-**89**; on copper plates, Nov 1-**90**
Photogrammetry *Sc Am Sup* * June 15-**89**
Photo-intaglio proc., Levy, inset *F Inst* * Nov -**92**. See also PHOTO-etching
Photo-lithographic transfers, Wilkinson *Sc Am Sup* May 11 -**89**
Photo-mechan. processes, Koehler (full) *Tech Q* Oct -**92**; Waterlon's mechan. works *The Eng* Oct 5, 5, 19-**88**
Photo-micrography, imps. in, Zeiss ap. *E News* * Jan 2-**92**; Pringle *Sc Am Sup* Oct 4-**90**
Physicians to Crown Prince of Germany, pors. *Sc Am Sup* * Feb 4-**88**
Physical, National laboratory, Webster *El Wld* Aug 6-**92**; ap., economical, Ince *Sc Am Sup* * Dec 13-**90**; science. See also GRAVITATION; MOUNTAINS; OCEAN; SCIENCE
Physics, Elements of (dynamics), Fessenden, bk., Macmillan, Lond. '92; precision of measurements, Holman, discuss. *Tech Q* Dec -**87** * May, (very full) *El Eng* Feb, May, July, Sep -**88**; law of inverse square, Wolcott, Nov -**89**; Physical Soc., flow in a strained elastic solid, C. Wilson *Eng* * May 16-**90**; pendulum measurements *Locom* Jan -**90**; absolute zero, Aug -**92**
Pwr what is a vacuum * Dec -**89**; stresses produced by sudden forces and shocks, Merriman *R & Eng* Dec -**89**; instability of solids, ed. May -**90**; expts. in, Hopkins *Sci Am* Feb 2-**89**; superficial tension expts. *Sc Am Sup* * Sep 8-**88**; Van 'T Hoff's law of osmotic pressure, Carnegie * May 16-**91**; expts. upon surface films, Rayleigh * June 11-**92**; regulator for maintaining constant exhaustion (gases in capillary tubes), Holman *Tech Q* * Sep -**87**
Physiography, diametral, Kalakaua *Eng* * Feb 24-**88**
Physiology of good and evil, Richardson *Sc Am Sup* Dec 14 -**89**
Piercy, Benjamin *Inst C E* v 96 -**89**

Piers, iron coal-pier, Norfolk & West. R., Va., Coe, *E Rec* * Oct 29, discuss., insets; iron wharf, Fort Munroe, Va., Duncklee, discuss., insets *Am C E* * v 27, 27 -**92** *E News* June 30; new, Southampton, Lemon *Eng* * Sep 2-**92**; pier head at Marine Park, Boston *E Rec* * Sept 21-**89**; on soft ground Ripley * Mar 29-**90**; iron ice pier, Newcastle, Del. * Apr 23-**92**

Inst C E compressed air foundations, Rochelle, La Pallice har., Thurninger, abs. v 100 -**90** *An Ponts* * Nov -**89**; No. and W. coast, Scot., Barron, inset *Inst C E* * v 99 -**90**; subaqueous part of, method of construct., Kidd * v 105 -**91**; and pile abutments, Jameson *R & Eng* * Feb -**90**; promenade pier, St. Leonards-on-sea *Sc Am Sup* * June 23 *The Eng* May 11, 11-**88**; at Brighton * Jan 29 * Feb 12, old chain pier * Mar 4-**92**. See also BRIDGES; HARBOR eng; PILES; TRESTLES

Pig-iron. See IRON, pig-iron

Pile-driving, uniform practice in, Crowell *E News* Dec 29-**88**, (full) * Oct 27, Nov 3, 17, discuss., inset (full) *Am C E* * v 27, 27 -**92**; factors of safety *E News* Dec 29-**88**, ed. Apr 6; formulas, Trautwine, cor. Mar 16, May 11; South st. bridge, Phila. * Oct 19, 19: cost of, Baker, Dec 14-**89**

E News and ditching plant, Om. & St. L. R., inset * Aug 16 -**90**; formulas, Husten, cor. and ed. Aug 25; safe load for piles, ed. Nov 17; pile-driving experience, Howe cor. Dec 8-**92**

E Rec pile driver and adjustable derrick * Nov 9-**89**, revolving hydr. * Apr 4; driving, Adams, July 25; a pendulum pile driver * Dec 5-**91**; driving, Jameson *R & Eng* Oct -**89**; triple row driver *The Eng* * May 8-**91**

Piles, allowable load on, Haagsma, cor. *Eng* May 6; pile and trestle timber structures, Western Am. R's, inset * 20-**92**; safe bearing load, formulas, Trautwine, cor. and ed. *E News* Dec 29-**88**, Jan 19-**89**; sinking, jet and screen dike, Missouri river com. * Dec 6-**90**

E Rec pile bridges cost of repairs, Talbot Sep 20-**90**; abutments and piers, Jameson *R & Eng* * Feb; preservation, Mc Intosh, June -**90**; safety of pile bridges *R Gaz* Apr 26-**89**, and trestle, Minneap. & St. Louis, Hixon, cor. * Apr 17, deep water R., Halifax har. * Dec 25-**91**; protection (cost), Pritchard *Sc Am Sup* Mar 1-**90**. See also BRIDGES; BUILDINGS; FOUNDATIONS; HARBOR eng; PIERS; TRESTLES

Piling, sheet, clamp for, Emery, inset *Am C E* * v 20 -**89**; Wakefield's sheet *E News* Mar 1, Harris cor. * 22-**90**

Piles, SCREW piles, in Germany *E News* * May 26; for bridge piers, Spring * Aug 4, cyl. pier sinking * Sep 8-**92**

Pill-picker machine *The Eng* * May 24-**89**

Pilot chart of No. Atlantic ocean, Hayden, map *F Inst* * Apr * June -**88**

Pinchin, Robert *Inst C E* v 95 -**89**

Pins, fibre stain in, J. B. Johnson *E News* * Jan 28, Du Bois, cor. Mar 10; strains in, Fowler, cor. * 24; and eye-bar proportions, Stowell, 31-**88**

Pipe-joints, steel, for spiral weld *E News* * May 31; lead, calking, Aug 30; Holmes' flexible * Nov 22-**90**; the Fenney cutting machine * Feb 21-**91**; cast iron water pipe cement joints, May 5 * Sep 8-**92**

Pipes, securing brass flanges to copper, Nagle *Am M E* v 9 -**88**; equation of, table *Cassier's* Nov -**91**; fittings moulding in U. S., Forbes *Eng* * July 20-**88**; water flowage in, Airy * Jan 4, 11; air vessels on, M'Creath * July 5-**89**; Pott's labor-saving fittings *E & Min* * Mar 7-**91**

E News and pipe flanges dimens., Codman * Jan 12-**89**; computations, Cox, diag. * Dec 22; measurement vel. of air in, Donkin, 22 *Inst C E;* hot water, india rubber, durability, Belleroche, abs. v 110 -**92** *Rev Mines* v 18 -**92**; cast iron, indus. in U. S. *E Rec* Mar 26; steel, specs. Dec 24-**92**; wrt. iron and boiler tubes, dimens., table, Morris, Tasker & Co. *Locom* Jan-**89.** See also GAS — SEWER — WATER pipes, etc.

Pittsburg, stats., Ricketson *Am Min* v 19 -**91**; *Eng* Oct 24 -**90**

Pivot bearing (footstep), friction, expts., report *Eng* Mar 27 * Apr 17-**91**

Planimeter, polar, novel applic., Emery, inset *Am C E* * v 18-**88**; polar, Gieseler *Sc Am Sup* * Mar 17; spherical, H. Shaw * Nov 3-**88**

Planing machines, plate edge, Forth bridge works *Eng* * Dec 14 -**88**; Sellers', Paris exhib. * Mar 14-**90**; double-acting tool rest *The Eng* Nov 9-**88**

Plante, Gaston, pors. *El Wld* * June 22 *E & Min* * 29 *Sc Am Sup* * July 13-**89**

Plants evolution, Coulter *Sc Am Sup* * June 16-**88**

Plaster of Paris manuf. and use *Sc Am Sup* Mar 21-**91** *Chem Tr J*

Platinum, electro-dep., Wahl *El Eng* July 16 *El Rev Lond* July 11 *El Wld* June 28 *F Inst* July, (full) *Sc Am Sup* Nov 22 *E & Min* June 21-**90**; metals (full) June 29-**89**; n Nov 29-**90,** Jan 3-**91**; *E News* Dec 20-**90**; and gold indus. of the Ural, Laurent, abs. *Inst C E* v 105 -**91** *An Mines* v 18-**90**; *Sc Am Sup* Nov 23-**89**; prep. and es. of pure, Mylins, Oct 29-**92**

Playing cards manuf., Chilon (full) *Sc Am Sup* June 29-**89**

Plumbing *E Rec* * Feb 4, 18 * June 9, 16; N. J. law, July 7 * 14, N. Y. specs. 21, Toronto, 28; Sep 1, 29, Nov 24-**88**; Boston Custom-house, May, June; Chic. regulations, Oct 26; N. Y. Cty. Court-house * Dec 21-**89**; Turn Verein building, N. Y. * Feb 8, 15; and drainage specs., N. Y. city, Apr 19, 26, May 3, 10; Boston law, June 21-**90**; St. Louis, Mo. inspection, Apr 4; Madison Sq. Garden, N. Y. * 11; Birm., Ala., practice (rules) * June 13; in 72d st. houses, N. Y. * Nov 14-**91**; Chic. ordinance, Feb 13; Fifth Ave. theatre, N. Y. * July-Sep; Suffolk Cty. Court-house * Sep, Oct -**92**

Pneumatic, hoisting, Wheeler *Am Min* * v 19 -**91**; dispatch, Wildemann system *Eng* * Nov 13-**91**; tool, MacCoy's, com. report *F Inst* July -**89**; pumping ap. *Iron Age* * Dec 8; dispatch improvements *Sc Am Sup* * Feb 27-**92** *Eng;* tubes, Postal telegraph system, Great Brit. *The Eng* * Dec 18-**91**

Pneumonia, M. Smith *Sc Am Sup* Dec 1-**88**

Pole road locomotives *E News* Mar 2-**89**

Police signalling, Morgan's aut. elec. system, Hill *El Rev Lond* * Mar 7-**90**

Pollard, Thomas S. *Inst C E* v 99 -**90**

Polygons, regular, graph. construct., Weihe *Lehigh Eng J* Feb -**89**

Pompeiian house of Pansa, restoration *Sc Am Sup* * Nov 8 -**90**

Population, the world's, n Eng p 458, Oct 16-**91**; finding the center of, n *E News* June 15-**89.** See also under names of countries, cities and places

Porcelain, manuf. in France *Eng* * Jan 17, 24 * Feb 7, 21 *Sc Am Sup* * Mar 22, 29-**90**; English china, Bayley, abs. Apr 7; manuf. possibilities, Elbers *E & Min* Feb 25-**88**

Portable engines and boilers. See BOILERS — ENGINES, portable

Porter, John A. por. *E & Min* * Sep 26-**91**

Post, penny, jubilee, ed. *Eng* May 23-**90**

Postal telegraph. [illegible] full. *The Eng* * Dec 18-**91**

Potash, yellow prussiate, new formula for, proposed. Stanwood *Tech Q* [illegible] -**92**. See also CHEMISTRY

Pottery and its materials. Lauder-Brunton *Sc Am Sup* * Aug [illegible]-**92**

Potash, [illegible] Payne *F Inst* Dec -**92**; yellow prussiate *Sc Am Sup* Aug [illegible]-**88**. See also CHEMISTRY, potash

Power, William A. [illegible] *J E* v [illegible] -**88**

Power [illegible] *J E* v [illegible] -**89**

Power, [illegible] A. [illegible] *E & Min* * Nov 17-**88**

Powder. See EXPLOSIVES, [illegible] — gun powder

Powell, John W., [illegible] *E & Min* Jan [illegible]-**92**

Power, measurement of. Gray *Am M E* * v 13 -**92**; hot air and steam [illegible] Nov -**91**; large units, economic limit of [illegible] Dec v **91**; supply in Liverpool, Feb 12-**92**; plants for [illegible] Aug [illegible]-**90**; over Rhone, util. of motive power [illegible] Powers, inset *Inst J E* * v 96 -**89**. See also [illegible] ELEC. motors — power transmiss; HYDRAULIC; [illegible] Falls [illegible] POWER transmission; RAILROADS, elec. power stations

Power [illegible] *Lond* * July [illegible]-**92**; and indic., Waite *El* [illegible] * Mar [illegible]-**90**

Power transmission, Hering [illegible] Apr; rope drive for, Grim-[illegible] * [illegible] speed, Spaulding *El Rev* * Dec 24-**92**; [illegible] Johnson *Eng* Mar 14, Hanssen, cor. Apr [illegible] -**88**; meas. distrib., Lupton, Sep 12-**90**; elec [illegible] and [illegible], Blaine, May 22, June 5 [illegible] transmitter * Dec [illegible]-**91**

[illegible] Nov 29-**90**; Hering, Mar 19 [illegible] -**92**; [illegible] Sprague *F Inst* * Mar * Apr -**89**; to [illegible] compressed air, Unwin *Inst C E* * v 93 -**88**; [illegible] * Mar [illegible]-**88**; by manila ropes, Gregg * [illegible] transmitter * 31 *The Eng* * Apr [illegible] rope for *St R J* * Apr * Sep -**90**. See also [illegible] DYNAMOS; ELEC. motors — power transmiss; HYDRAULIC; RAILROADS, elec. power stations; [illegible] rope

Precious stones, [illegible] Kunz *E & Min* Jan 2-**92**; Kunz [illegible] Sep, Oct **90**; and diamond cutting, do. *Sc Am Sup* [illegible] **91**; in ast decade, do. full, *Sc Amer Mass* -**88**

Preservaline, for meat. Payne *Sci Am Sup* Feb 6-**92** *F Inst*

Presses, power press problems, O. Smith *Am M E* v 9 -**88**; foot press, n *Eng* * Mar 13-**91**; drop, foundations for, Gorham Mfg. Co., Prov., R. I. *E News* * Feb 22-**90.** See also FORGING — PACKING — PRINTING presses

Pressure gauges, for high pressure gases, Budenberg *Eng* * Jan 29-**92**; open mercury column for high pressures, Bird *E News* * July 19-**90**; mercurial, on Eiffel tower *E Rec* May 23-**91**

Prices, regulation, legal theories of, Hadley *R Gaz* Aug 12-**92.** See also FOOD; LABOR and names of articles

Priestley, Joseph, por. (full) *Sc Am Sup* * May 4-**89**

Prime, Charles *Inst C E* v 102 -**90**

Prime movers. use of spirit in, Yarrow *The Eng* * May 31, ed. June 21; the Cardium (nature of), Gamgee * Oct 18, Nov 1-**89.** See also ENGINES; HOT air engines; LOCOMOTIVES; TIDE motors; WINDMILLS

Printing, or relief plates making, Joyce proc., Hoke or Star proc. and Hanson proc. *Sc Am Sup* Oct 19-**89**

Printing machine, the electro-matrix *E News* Apr 13-**89.** See also TYPE-setting machines

Prison reform, Canonico *Sc Am Sup* Sep 3-**92**; Wayland *Soc Arts Mass* -**89**

Prjevalsky, N. M. (explorer-Asia) (full) *Sc Am Sup* Feb 23-**89**

Professions, the, shall they be regulated, Shaler *E Mag* Oct -**92**

Professors, private practice by, ed. *Eng* Oct 23-**91**

Progress, vibratory law of, Hovey *Sc Am Sup* Dec 22-**88**

Projectiles, elec. welded, Maxim *Cassier's* * Oct -**92**; vel. of, Holden *Eng* Oct 23-**91**; Justin projectile, expts. *E News* * Aug 4-**92**; path of, Gilman *F Inst* Oct, Ingalls, cor. Nov -**91**; forged steel, manuf., Carnegie, abs. *Inst C E* v 110 -**92**; Krupp's and plates expts. at Meppen *Sc Am Sup* * Sep 8-**88,** do. and Brit. steel-faced plates *The Eng* July 13-**88.** See also GUNNERY and armor

Propeller, the jet *Sc Am Sup* Nov 15-**90.** See also SCREW propellers

Providence, R. I., Brown University *Eng* * Sep 11-**91**

Psychical research, Savage *Arena* Nov, (how we feel when we die) *Rev of Revs* Sep; Psychology, internat. Congress *Sc Am Sup* Dec 24-**92**

Public works, National, cor. *F Inst* Sep -**88**

Pulley block Weston's triplex spur gear, Yale & Towne Co. *Eng* * Aug 22 *E News* * July 26-**90**

Pulleys, cone and step, method of finding diams., C. A. Smith *Am M E* * v 10 -**89**; wood (various) *Pwr* * Mar; size and speed * Oct -**92.** See also BELTING

Pullman, Ill. *Eng* Oct 31-**90**

Pulsometer, test of a, De V. Wood *Am M E* v 13 -**92** *E Rec* Nov 21 *The Eng* Dec 25 *E News* Nov 21; Mashin's aut. steam vac. * Apr 4-**91**; De V. Wood *Sc Am Sup* June 29, improvements * Sep 14-**89.** See also PUMPS

Pulverizers, Buchanan's Granulator *E & Min* * Jan 17-**91**; Am Ball * Sep 24-**92**; the Ball mill *The Eng* * Sep 26-**90.** See also DISINTEGRATORS; GRINDING; MILL, the Sturtevant

Pumping engines, Cornish or double beat pump valves, Nagle *Am M E* * v 10 -**89**; new type, Laval *Cassier's* * Sep -**92**; trip-expan., Mildura Irrig. Co., inset *Eng* * Jan 18; machinery, Paris exhib., Hanarte system * July 26-**89**

E News proposals, table, Feb 4-**88**; compound, power of, tables, Hill, Apr 27-**89**; machinery in the Fenland and by the Trentside, Gibbs, inset *Inst C E* * v 94; underground, Bernissart coll., Ledent, abs. v 94 -**88,** do. high-lift, Vanhassel, etc., abs. v 107 -**92** *Rev Mines* v 2 -**88,** v 15 -**91**; machinery, ancient and mod., Holloway *Sc Am Sup* June 29-**89**; compound differential, Bradley, inset *The Eng* * July 23-**91**

BOSTON, high-duty, relative econ., ed. and cor. inset *E News* * Dec 22, 22, Leavitt *E Rec* * June 4-**92**

BOURNMOUTH water-works, Worthington *The Eng* * Jan 4-**89**

BROOKLYN, N. Y., water-works, of 1860, hist., McElroy *Am M E* v 13 -**92**; 48-in. check valve *E News* * Oct 24-**91**; Milburn station, trip-expan., inset * Mar 12-**92**

CHICAGO, Ill., West Side station, test of Indiana block coal, Nagle *Am M E* v 13 -**92**; tests *E News* Jan 31; trip-expan., inset * May 31-**90**

CORNISH, 'Davey' *Cassier's* * Dec -**91**

CROYDEN water-works, compound, inset *The Eng* * Aug 29-**90**

DAVEY'S differential, n *The Eng* Jan 13-**88**

EATON water-works *The Eng* * Dec 30-**92**

ELECTRIC machinery, Wheeler *Cassier's* * Nov -**91**; in mines *E & Min* * June 15-**89,** coal mines *R & Eng* Mar -**88**

HAMPTON, Davey's compensating lever at *Eng* * Apr 22-**92**

HARTLEPOOL Gas & Water Co., compound condens. *The Eng* Dec 21, 21-**88**

HYDRAULIC, Pearsall *E Rec* * Sep 26 *Inst C E* * v 106 -**91**

Pumping engines, LONDON, East, water-works trip-expan., inset *Eng* * Aug 8-**90**
LUTON, sewage at, inset *Eng* * Mar 29-**89**
MECHALKONITZ, Moravia, underground at, Sauer, abs. *Inst C E* v 92 -**88**
MEMPHIS, Tenn., Worthington high-duty *Eng* * Feb 12-**92** *E News* * Aug 17-**89,** tests * Sep 12-**91**
MONTREAL water-works, cost of pumping '89 *E News* Dec 6-**90**
PAWTUCKET, influence of steam jackets on, Denton *Am M E* * v 11 -**90,** Kent, v 13 -**92**
PETERSHAFT underground, inset *Eng* * Oct 19-**88**
RHYMNEY iron mines, inset *The Eng* * Sep 19-**90**
SCREW, Milwaukee flushing tunnel *E News* * Mar 8-**90**
TRIALS, duty trials of, Coon *Am M E* v 9 -**88,** standard method, com. report, discuss. v 11, 11-**90** *E Rec* May 24, 31-**90**; Worthington, performance against a head equiv. to 2,000 ft. of water, Denton *Am M E* * v 12 -**91**; Chic. West side station, test of Indiana block coal, Nagle; pump test receiving water under pressure, Norris * v 13, 13 -**92** *Iron Age* * Dec 8-**92**; Worthington high duty, Unwin report *Pwr* * Jan -**89** *Eng* * Dec 7-**88**; duty, Barrus, Feb 8, 15, Mar 1-**89** *The Eng* Feb 21-**90** *E News* Gaskill-Holly, duty and capac. test, report * Feb 18; duty trials of, May 25, June 9-**88**; Barrus, Jan 19, 26, abs. *Inst C E* v 98 -**89** *J Assoc E Socs*; performance of best mod. vs. Cornish of 1840, Denton *E News* Dec 28-**89** * Jan 4, 18, 25, Feb 1, 8, 22; Chic. West Side tests, Jan 31-**90**; Worthington high duty tests, Memphis, Tenn. * Aug 17-**89** * Sep 12-**91,** do. tests, Lowell, Mass., Barrus * Feb 20 * Apr 16 *E Rec* Apr 9-**92** *E Rec* Worthington high duty, at Hampton, England, Unwin, Dec 22, 29 *The Eng* Dec 7, 14-**88**; Addington station, effic. *The Eng* * Aug 29-**90.** See also ENGINES, tests and trials
UXBRIDGE water-works *The Eng* * Feb 12-**92**
WESTON-super-mare, differential compensating *The Eng* Jan 13 -**88**
WHEELOCK, for Eiffel tower lifts *The Eng* * Mar 7-**90**
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GOLIATH and steel base plate, Sandberg's *E News* * Nov 9 -**89**
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[illegible] of the west (boats). Sweeney * v 9 [illegible] measurements. U. S. Geol. survey results. Newell [illegible]-**92**; signaling across in India. Melbuish [illegible]-**90**; future world's highway. Gribble [illegible] efforts in western. Going. Sep-**92**; [illegible] *E & Min* * Sep 3-**91**

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[illegible] ascertaining discharge. Har-[illegible]-**88**, bars at mouths of tidal estua-[illegible] discuss. inset very full. *Jnl* [illegible]-**90**; [illegible] Stearns, abs. v 106-**91**, [illegible]-**92**; [illegible] *Stat Bd of Health*; crossings [illegible] *E & Eng* * Nov * Dec-**88**; nav. [illegible] ap. *Sci Am Sup* * Sep 24-**92**

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AIRE & Calder nav. and canal waterway, Bartholomew *E News* * Aug 30-**90**

AVON imp. below Bristol, Chatham, insets *Inst C E* * v 98 -**89**

BAVARIA, imp. *E News* * Mar 17-**88**

BILBAO imp. *E News* * Aug 31-**89**, Churruca report, abs. *Inst C E* v 76, 98, 104, insets, 107 -**92**

BRAZOS, Tex., imp., jetties *E News* * May 18, June 22-**89**

BRENTA imp., Cesareni, abs. *Inst C E* v 99 -**90**

CLYDE, Millar, Blackie, Lond. '88, bk; export trade '88 *Eng* Jan 4; Macalister, abs. *Inst C E* v 95 -**89**

COLORADO cañons, availabil. for R. purposes, Stanton, discuss., insets (full) *Am C E* * v 26 -**92**

COLUMBIA, jetty *E News* * Apr 18-**91**

COSEL, imp. at, Oder river (Europe) *E News* * May 3-**90**

DANUBE imp. *E News* July 11-**91** * Apr 2-**92**; the Sulina mouth of, Kuhl, Hartley append., insets, *Inst C E* * v 91 -**88**, inset * v 106 -**91**

DELAWARE, obstructions in *Sci Am* Mar 16-**89**

ELBE, ht. prediction of, in Bohemia and Saxony, Harlacher, Richter, abs. *Inst C E* v 91; regulation between Melink and Koniggratz, Oelwein, abs. v 92 -**88**; Sax., flow measurements, 1886-7, Ringel, abs. v 95 -**89**

JAMES, imp. at Richmond, Va., W. Adams *E News* Nov 22 -**90**

LOIRE, imps., Paris exhib., map *Eng* * July 19, 26-**89**

MAIN, canalization between Frankfort and Mainz, abs. *Inst C E* v 92 -**88** *Deut Bauz* -**87**

MISSISSIPPI imp., flood hts. in reach between Helena and Vicksburg, Starling, insets *Am C E* * v 20 -**89**, keeping within banks, do. *E Mag* * Apr -**91**; impending disaster on, June, prob., Dutton, Aug, Starling * Nov -**92**

E News connecting with upper lakes, Handburg, Feb 18-**88**; Gov't. protective works, mat, Memphis * Oct 26; levee con-

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struct. Nov 9; bank protection * Oct 26, Dec 14-**89**; flood of 1890, Harrod, Apr 5; Lower, protection from overflow, J. B. Johnson, 19-**90**; Sabine Pass imp., Turtle cor., Haupt *F Inst* Aug -**88**; hist., Redway (full) *Sc Am Sup* July 11, 18-**91**
ODER, imp. at Cosel (Europe) *E News* * May 3-**90**
PORTLAND, W. T., imp., Freeman, inset *E Mag* * Aug -**92**
POTOMAC basin, hydrography of, Babb, discuss., inset *Am C E* * v 27 -**92**
RHINE reg. works, between Eltville and Oestrich, Imroth, abs. *Inst C E* v 92 -**88**; reg. at St. Gall, Wey, abs. v 103 -**91**
RHONE, imp. of months of, Guerard, report abs. *Inst C E* * v 101 -**90.** See also POWER, Rhone river at Geneva
SEINE, lower, Suresnes locks and weir, Luneau, abs. *Inst C E* v 101 -**90** *An Ponts* * v 18 -**89**; canalization of, abs. *Sc Am Sup* * Mar 16-**89** *Genie Civil*
STEEPING and Wainfleet Haven imp. *The Eng* * May 13-**92**
SUSQUEHANNA floods, Raymond report *E Rec* Jan 23-**92**
WEAVER nav., Sauer *E News* Aug 30-**90**; Stoney's sluices, Manchester ship canal *The Eng* * Jan 9-**91**
WITHAM channel and outfall imp. works, Williams, discuss., inset *Inst C E* * v 95 -**89** *The Eng* Dec 7-**88**
YELLOW *E News* Mar 31-**88**
Rivet signs, uniform system of *E News* Jan 25, cor. Feb 9, symbols, cor. * Mar 2, Seaman, cor. * Apr 13-**89**; diag. * Sep 15 -**92**
Riveted joints, on an angle, expts., Flint *Am C E* * Oct 27-**92**; copper, strength *Eng* * Apr 24; * Dec 4-**91**; riveting tests, Buckholz * Dec 6-**90**; diags. * Feb 6-**92**; net section in, Cooper *R Gaz* * Aug 22; plates, tests * Oct 10-**90**; Allen (full) *Sc Am Sup* * July 18-**91**; of max. strength, Nicolson *The Eng* Oct 19, Nov 9, 30-**88.** See also BOILERS, riveted joints
Riveter, Allen pneu. *Eng* * Nov 23-**88**; Schonbach's hydr. * May; hydr., 200-ton plant * Feb 14, 14-**90**
Road engines, rollers *Cassier's* * Aug -**92**; locom., Burrell *Eng* * June 20; steam on common roads, McLaren, Nov 21 *The Eng* Nov 21 *E News* Dec 20; locom., Aveling & Porter * June 28-**90**; traction, European experience, McLaren * Apr 4; the Springfield steam roller, inset * Nov 21-**91**; Burrell compound *The Eng* * Dec 12-**90**; 8 h. p. compound * Sep 11 -**91**

Roads, betterment of our highways, Shaler *Atlan M* Oct; and road rollers *Cassier's* * Aug; our common roads, Potter *Century* * Apr -**92**; highways and nat. prosperity, North *E Mag* * Apr; good wagon roads, importance, Haupt, June; Europe and Am., Potter * Aug; wagon, future, Claypoole, Oct -**91**; convict labor in road making, Roberts, July -**92**; *E & Min* Apr 16, Mundin, Baker, 23-**92**; and pavements, Love, bk. n July 12-**90** *E Rec*

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E News country, notes, Downing, Feb 8; foreign highway construct. and maintenance, 22, Mar 1, 15, 29; maintenance, Roads Imp. Assoc., Lond. * Aug 16; repair and maintenance of, England, Sep 13; road work in Richmond Cty., N. Y. Dec 13-**90**; country, money value of good, report, Feb 7-**91**

E Rec road making, Herschel (prize treatise) Mar 9, Apr 20, 27, May 4, 11; Greene, Aug 10 *Harper's W* Aug 10, 17; good, Pope *E Rec* 31, Shaler, abs. Nov 9 *Scribner's;* Bridgeport macadam, North *E Rec* Dec 28-**89**

E Rec resist. to traction, Hering, Jan 25; Penn. highways report, Feb 15; construct. and maintenance, Thompson (prize article) Mar 29, Apr 5-19, Pritchard, 19, 26, May 3, com. comments, 10; main, maintenance, Hooley, Aug 10; machinery, cost of, Oct 4-**90**; European sts. and highways, Dec 12; Brookline, Mass. macadam, contract, 19-**91**

E Rec county, construct. and repair, Owen, Jan 30 *Sc Am Sup* Mar 12 *E News* Feb 13; road across a marsh, Waite cor. *E Rec* Feb 20; highway roller repairs, French system, Durand-Claye, Mar 5, Bacot, cor. 19; road making in eastern Mass., McClintock, 26; administration of French highways, Neff, Apr 16; Telford road making, Lenox, Mass. * 30; instruction in highway eng., C. Allen, June 11, July 2, 23, (full) *Soc Arts Mass* -**91**; highway construct., disputed points, Owen, Nov 19 -**92** *Am C E*

Inst C E roadways construct. across peat bogs, Schacht, abs. v 104 -**91**; highway, location, ed. *R & Eng* * May -**90**; sections, Prov., R. I. * July; Janvier *Sc Am Sup* Feb 27; legal

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responsibility for defective highways, Bly *St R J* Mar -**89**; Brighton foreshore imp. *The Eng* July 12-**89.** See also MUNIC. eng; PAVEMENTS; STREETS

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Roanoke, Va., survey of *E News* * Jan 9 * June 23-**92**

Roberts, Peter *Inst C E* v 96 -**89**

Robertson, Henry *Inst C E* v 93 -**88**

Robertson, James (full) *Inst C E* v 99 -**90**

Robinson, Moncure (full) *Am C E* v 26 -**92,** n *R Gaz* Nov 13-**91**

Robinson, S. S., por. *E & Min* * Apr 11-**91**

Rock, drilliing machine, hydr. *Eng* * Feb 17-**88**; Dubois' boring machine, Paris exhib. July 12-**89**; M'Culloch's drill, Rio Tinto * Sep 12-**90**; drills, Carbutt & Davey, Mar 27; and ore breaker, Gates I. Co., Chic. * June 19-**91**; and ore crusher, Brennan *E News* * Oct 18-**90**; removal under water without explosives, Lobnitz, inset *Inst C E* * v 97 -**89.** See also DISINTEGRATOR; DRILLS; MILLS; QUARRIES; STONE and names of rocks

Roe, John P. *Inst C E* v 98 -**89**

Roehricht, Richard H. O. *Inst C E* v 106 -**91**

Rogers, William *Inst C E* v 95 -**89**

Rolling mill engines, reversing, Krupp works, Essen, Ger., inset *Eng* * Sep 5-**90**; details * Dec 4-**91**; 10,000 h.p., Jarrow *The Eng* * Aug 9-**89**

Rolling mills, Simond's universal *Eng* * May 25 *Sc Am Sup* * May 5-**88** *Iron Age*; 15 in. 3- high blooming, Lack. I. & C. Co., Scranton, Pa., inset *Eng* * Jan 23; rolling fluid metal, H. Bessemer * Oct 9-**91**; failures of chilled iron rolls, Winder * Oct 21-**92** *E & Min* construct. of passes in rolls for reducing metals, Hewitt, Aug 25 * Sep 1-**88**; Am., evolution of, R. Hunt *E News* Nov 28, 28, (full) *R Gaz* Nov 20-**91** *Am M E*; universal, for girders and cruciform sections, Sack *Sc Am Sup* * Jan 7-**88** *The Eng* * May 10, 17-**89.** See also STEEL, German works

Rome, excavs. in ancient, Lubbock *Sc Am Sup* Mar 22-**90**; devel. of capital at, Hemphill, Oct 1-**92**

Roofing, slates, strength and weathering qualities, Merriman, discuss., insets *Am C E* * v 27 -**92** *E & Min* Sep 24-**92**; paper for material *E News* Sep 21-**89**; roll tar paper manuf. (full) *Sc Am Sup* Sep 26-**91**; tiles glazing, terra cotta, etc. July 9-**92**

Roofs, det. of stresses in elastic systems by method of least work, Cain, inset (full) *Am C E* * v 24 -**91**; Cathcart st. station, Greenock R., inset *Eng* * Mar 22-**89**; Fairfield works boiler shop, Govan * Oct 3-**90**; July-Sep -**92**

E News 22d reg't. armory drill room, N. Y. * Apr 13-**89**; truss failure, Troy, Ala., cor. * May 9-**91**; trusses, coeffs. for figuring strains in, table * Aug 11; 4-mile crib, Chic. * Sep 15 -**92**

E Rec 12th reg't. armory, N. Y., inset * Jan 7; truss, So. Brooklyn R. car shed * Mar 17; a cantilever * Aug 4; St. Paul church * Oct 27; rink truss * Nov 17-**88**; So. armory drill-hall * Apr 20; armory, Cin., O. * Dec 7-**89**

E Rec iron mill * Jan 25 * Feb 1-**90**; arcade, Cleveland * Mar 21, 28 * Apr 4; erection traveler, Newport News Ship Bld. Co. * Apr 25; Charleroi plate glass works * May 9; iron shop * Aug 29; strains in trusses *Locom* * May -**91**

R Gaz Westinghouse machine shop * June 6; rational trusses Arajol, June 27, cor. *The Eng* * Oct 24-**90**; roof water removal, Porter *Sc Am Sup* * May 18-**89**; iron *St R J* * Aug -**90**; iron, So. Mahratta R. *The Eng* Oct 19-**88**; barracks at Aden, Aug 30, Sep 6-**89**; a rational truss, Graham * May 16-**90.** See also BUILDINGS; EXHIBS., U. S. Columbian – U. S. Gov't. bld; FACTORIES; MILLS; Rs, stations, etc.

AGRIC. bld., Chic. exhib. *Eng* * Apr 29 * May 6-**92**

ALLEGHENY County court-house *E Rec* * Nov 10-**88**

CARLISLE Corp. markets *The Eng* Mar 30, Apr 13, 13-**88**

CHICAGO Auditorium trusses *E Rec* * Nov 22, 29-**90**

DULUTH Union depot *E Rec* * Feb 6 * Mar 12, 19, 26 * Apr 9, 23, 30 * May 21-**92**

DUNDEE R. station, Caled. R., inset *Eng* * June 28-**89**

EDINBURGH exhib, inset *Eng* * Apr 11-**90**

FOUNDRY plant, the Worthington, Elizabethport, N. J. *E Rec* * Apr 2-**92**

HORTICULTURAL bld., Columb. exhib. *Eng* * Nov 11, 18, 25-**92**

MACHINERY Hall, Columb. exhib. *E Rec* * Dec 24, 31-**92**

MADISON Sq. Garden bld. *E Rec* * Jan 17-31-**91**

MANUF'S bld., Columb. exhib., insets *E News* * July 28 * Sep 1, 8-**92**

OLYMPIA, Nat. Agric. Hall, erection, Read *Eng* * Dec 28-**88**

PARIS exhib., Machin. hall, inset *Eng* * June 1-**88**; blds. * May 3-**89**

Roofs, Penn. R., Jersey C. terminal station *Eng* * Apr 1-**92**, train shed, inset *R Gaz* * Oct 2-**91**

Transport. bid., Columb. exhib. *Eng* * Dec 2, 9, inset *E News* * 29-**92**

U. S. Columb. exhib. bids. *Eng* * Oct 30, inset * Nov 13-**91** *E Rec* * Aug; Gov't bid. *Eng* * June 10-**92**

Rope driving power transmiss., and cable, best speed of, Cooper, discuss. *Am M E* v 9-**88**; two haulage systems, Norris *E Rec* * June 27 * July 18 *Am M E* * v 12; C. Hunt * v 12-**91** *E News* * Nov 15-**90** *E & Min* * Jan 31-**91** *E Rec* Nov 15 *Pwr* * Dec-**90**, Jan-**91**; Grimshaw *Cassier's* * July, influence of longitude on, do. Oct; ed. *El Rev Lond* Sep 16-**92**; underground haulage, J. B. Smith *Eng* * Feb 17 * Mar 2, 23; Otto system haulage * Apr 6-**88**; Miller, diag. *E News* * Dec 8 *The Eng* Dec 19-**90**

Pwr Seymour * May-July * Nov-**89** * June * Sep-**90**; at Willamette mills, Portland, Or. * Jan-**92**; *Sc Am Sup* * Mar 24-**88**; by manila ropes, Gregg * May 24-**90** *J Assoc E Socs*; *Sc Am Sup* May 24-**90**; * Mar 24-**88**; *St R J* * Apr * Sep-**90**. See also Power transmission; Telpherage

Ropes, manila and hemp, strength and power transmiss., Miller, diag. *E News* * Dec 8; *The Eng* Dec 19; and hitches *E Rec* * July 19-**90**; strength of, Duboul, abs. *Inst C E* v 92-**88**, do. expts., French *R Gaz* June 29-**88**. See also Cables; Wire ropes

Ropes Pass, Texas, Kent *E Mag* * June-**92**

Rose, George H. *Inst C E* v 95-**89**

Rotary boilers connections *Locom* * Aug-**90**

Rotary engines, ancient and mod., Jamieson *Cassier's* * Feb-**92**; Brown's *El Rev Lond* * July 10-**91**; duplex *El Rev* * Nov 29, n *El Wld* * Apr 12-**90**; the Rota *Eng* * July 20; Lidback's vibrating *F Inst* Oct *R & Eng* * Nov; Bullock *Pwr* * Apr; Rigg's *Sc Am Sup* * Mar 10-**88**; revolving cyl. * Nov 8; *The Eng* * Mar 7, valve gear * Apr 25-**90**, * Jan 23; hydr. winding with variable stroke * Oct 16-**91**

Rotary-piston valve, engine governing by, Aldrich *Am M E* v 13-**92**

Rotary pumps, Johnson's *The Eng* * July 3, boiler feeder * Dec 25-**91**. See also Pumps, rotary

Rouen port, France *Eng* * Oct 11-**89**

Routing machine, Parry's *Sci Am* Mar 23-**89**

Routledge, Thomas *Inst C E* v 92 -**88**
Rowland, Henry A., por. *El Wld* * Mar 9-**89**
Royal Institution Soc., Lond. pro. *El Rev Lond* May * June 12-26-**91**; *Eng* May 16, 23-**90,** May 22, 29, June 5-26, July 3, 10, Dec 18, 25-**91,** Jan 8-22, Feb 12, Mar 4, 11, 25, June 17, July 22, Aug 12, 19, Dec 9, 30-**92**; pors. members *Sc Am Sup* * Sep 7-**89**; June 14-**90**
Rubber, india, properties, in Russian navy, Vladimiroff, abs. *Inst C E* v 109 -**92**; *Sci Am* Apr 6-**89**; vulcanization of, Gerner *Sc Am Sup* Jan 4; * July 12, Sep 6; indus., hist. (Hayward's expts.) Oct 18; vulcanization and decay of, notes, W. Thomson, Dec 6-**90**; supplies sources, Sherman, Feb 6; gathering in Amazon valley, Kerbey, Mar 19-**92.** See also GUTTA-percha
Rundle, Cubitt S. *Inst C E* v 100 -**90**
Russ, William *Inst C E* v 104 -**91**
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Ryan, Jeremiah *Inst C E* v 107 -**92**

Sabine Pass imp., cor., Turtle, Haupt *F Inst* May -**88**
Sacre Charles R. *Inst C E* v 98 -**89**
Safety lamps, the Thorneburry *Eng** Nov 15-**89**; miner's, notes, Hughes *E & Min* * Mar 28-**91**
Safety valves, lever (full) *Locom* * July -**92**
Sahara, the, James *Locom* Aug -**89** *Sc Am Sup*
Sails, action of, Vogt, cor. *Eng* * Oct 11 *Sc Am Sup* * Dec 21 -**89**
St. Louis, Mo., pavements, Macklind *E News* Mar 14; topog. survey of, Connet, Oct 31-**91**; pub. works management, Jan 23; new growth of, Ralph *Harper's M* * Nov -**92.** See also PAVEMENTS; SEWERS; STREETS; WATER-works, etc.
Salida, Col., inset *E & Min* * Dec 21-**89**
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Sc Am Sup from sea-water, Merrill, Apr 20; manuf. n Sep 7 -**89**; works, Cheshire, Apr 19; manuf. in vacuo, Nursey * July 26; mines, Retsof, Greigsville, N. Y., Sheldon, Dec 20-**90**; N. Y. indus. * Nov 14-**91**; *Iron*

Salter, Frank *Inst C E* v 96 -**89**

Samoa *Century* May -**89**

Sand pumping, dredging and Mersey bar, ed. *Eng* Apr 11-**90**

Sandstone indus., U. S., Day, Cens. bull. abs. *E & Min* July 4 *E News* 18-**91**

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Santoy, John B. Austis du *Inst C E* v 96 -**89**

Saw machine, double band, for deep cutting *The Eng* * Mar 8-**89**. See also BAND saws

Scales, comparison of binary and decimal, table *Locom* Dec -**88**

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Scarlet fever, etiology of, Klein *Sc Am Sup* Jan 21, Mar 17-**88**

Schaufuss, Erich C., Bowden *Am Min* v 17 -**89**

Schiseophone (flaws in metals) ap. *Sc Am Sup* * July 5-**90**

Schliemann, Heinrich, por. (full) *Sc Am Sup* * Feb 28, Manatt, 28-**91**

Schmidt, Bernhard *Inst C E* v 96 -**89**

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E News premiums for graduating theses, Jan 30; Mass. Inst. of Tech. July 14, 21; Cornell Univ. 28; Lawrence Sci. reorganization, Sep 22-**92**; education, value and drawing and hand-

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Tech Q Mass. Inst. of Tech., beginning, Munroe, May -**88**; sci. and tech., place of in Am. education, Walker, Dec -**91**; English composition in colleges, Carpenter, Oct -**92**. See also EDUCATION; ENGINEERING schools

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Screen, gyrating, Coxe & Salmon *Eng* * Aug 30-**89**

Screw bolt, expts. with, McBride *Am M E* * v 12 -**91**

Screw propellers (marine), effective area of screws, Jacobus *E News* Aug 3 *Am M E* * v 11 -**90**; effic. as dependent on surface form of propeller, Durand * v 13 -**92**; planing machine, Sunderland *Eng* * Jan 27; expts., Andreœ * Apr 13; blades material, Parsons cor. 20; Dickinson's * 27 *Sc Am Sup* * May 26-**88**

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effic. *Sc Am Sup* Dec 31, ed. and cor. Oct 28, Nov 4, 4-**92** *Inst M E*; physics of, Lowe *Sc Am Sup* May 2-**91**
The Eng Trew cor. Aug 24; ed. Dec 28-**88**; blades design, Fitz Gerald * Aug 22 * Sep 19; Mansel cor. Oct 31, 31-**90**; Vogt cor. * Feb 6; Fitz Gerald cor. May 8; ed. July 17; Mc Glasson's reversing * Oct 23; typical (shapes) * Dec 25-**91**; Mansel cor. Dec 23-**92**

Screw pile pier at Kotonon, in Africa, inset *E News* * Oct 6-**92.** See also PILES, screw

Screws, perfect, prob., Rogers *Am M E* * v 12-**91**; wood, rolled *Eng* * Nov 22-**89**; Lieb's ball bearing *The Eng* * Nov 28; anti-friction, Dec 12-**90**; screw threads, Gill *F Inst* * Mar-**88,** Forney *R & Eng* * Oct-**90.** See also SCREW bolt

Sea-beaches, Shaler *Scribner's* * June-**92**

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Talc *E & Min* May 25-**89**

Talking machine. See PHONOGRAPH

Talman, James J. *Inst C E* v 110 -**92**

Tank sluice with equilib. valve, Larmunie *E News* * Feb 14 -**91**

Tannin, chestnut wood bark, Trimble *F Inst* Oct -**91,** May -**92** *Sc Am Sup* Nov 14-**91**

Tanning, elec., Worms & Bale ap. *El Eng* * Nov 26; creosotic acid employment in, Hauff *Sc Am Sup* May 3; anal., Muter * Sep 6-**90**; materials of Europe, May 23; by aid of electric., Rideal (full) * Aug 8-**91**; plants capable of yielding materials, Mafat, Oct 8-**92**; applic. of alpha-sulphonic acid of naphthaline to bating and puring of hides, Burns *Tech Q* July -**91**; theory and practice, Salomon, Apr -**92.** See also ELEC.—LEATHER tanning

Tarbotton, Mariott O. *Inst C E* v 91 -**88**

Tar furnace, Anderson *Sc Am Sup* * Feb 11-**88**

Tariff and the constructive arts, Thurston *Cassier's* Jan -**92**

Taxes, U. S. *E News* June 1-**89**

Taylor, John *Inst C E* v 109 -**92**

Teaching of science, com. report (full) *Sc Am Sup* Jan 25, Feb 1-**90.** See also SCHOOLS; SCIENCE

Technical Soc. of Pac. Coast, Geldern, pors. *Cassier's* * Oct -**92**

Telegrams and storms, Slingo *El Rev Lond* Jan 23, 30, Feb 6-20-**91**

Telegraph *El Eng* wire, hard drawn cop., durabil., Maver, Apr -**88**; line adjust., Delany * Dec *El Rev* * Nov 30 *El Wld* * Apr 27 * Nov 30, multiplex, new sys., Patten's (full) *El Eng* * Mar-**89** * June 18; circuits, Jones' main office * Dec 17-**90**; writing tel. * June 3-**91**

El Eng mod. Am. ap., F. Jones * Mar 30, May 25 * June 22 * July 27 * Aug 3, 17; wire joints, breaking strain in hard drawn cop., Jones, June 1; type, the Am. n * July 27; cable, Burke relay and transmitter * Dec 7-**92**

El Rev Lond R. survey system, Gilbert * May 18; transmiss. limit, Moon, Aug 10; submar. cables and ocean temps., Bright, Nov 16-**88**; cables, of world, Feb 15; Siemen's recording ap. for compact Morse writing * Mar 8; Submar. Co. 29; ocean probs. and conditions, Apr 5; trans-atlan. cable routes * Aug 2, map *El Wld* * July 27; high vs. low speed, finan. compar. *El Rev Lond* Aug 16, Linckens *El Rev* Sep 7; cable manuf. early hist. *El Rev Lond* Dec 13-**89**

El Rev Lond submar. cables, aut. reversal signaling on * Feb 7; protection, lightning guards, Lodge * May 16-30; elec. curs. in conductors, Bennett * July 25; sub. cables, interrupts. and repairs, '88 89, table, Aug 22-**90**; prog., '96, Feb 6, in England,

Telegraph

Preece, Sep 18; sub. cables, India-rubber core in * Mar 20; pictorial * Dec 4-**91**; ap. constants, Moon, Apr 29; sub. cables, double differential relay, Raymond-Barker * July 22-**92**

El Rev hist., Vail May 5 *Century* Apr -**88**; cables, broken ocean, Oct 5; multiple, synchronism in, Morse, Nov 16; cable manuf. hist., Barrett, 23-**89**; tournament (fast sending) * Apr 12, 19; curs. in conductors, obs., Bennett * Aug 23; writing, prins. of, Morse * Nov 15-**90**

El Rev and telephone, inventors of, Gray addr. Apr 18 *El Wld* 25 *E Mag* June 20 *Sc Am Sup* 20; and pat. stats., Brit. *El Rev* June 27; musical, Hachenberg, por. * Nov 14; a pub., Hale, Dec 5-**91** *Cosmopol;* in Am. *El Rev* Feb 20-**92**

El Wld dynamo-elec. machines in, West. Un. bld., Maver * Feb 11, 18; quadruplex, imps. do. * May 19, 26 * June 2, cor. * Oct 27; trans-pac. cables, proposed, table, July 14; Gray telautograph * Aug 11; with pulsatory and undul. cur. sigs., Maver * 25 * Sep 8, 22 * Oct 6; and telephony, Jacques' simul. system * Nov 17-**88**

El Wld ocean probs. and conditions, Weatherbee * Jan 26; imperfect earth in circuits, phenom., Kenelly * Mar 16; line construct., Paris exhib. * Nov 9-**89**; quadruplex, Healy * Jan 18; submar., Webb (full) Mar 1, (full) *Sc Am Sup* Apr 19; fast sending contest *El Wld* * Apr 19; signaling across rivers, India, Melhuish * May 10; nationalizing, Wiman, Dec 30 -**90**

El Wld electric., galv., mag. and teleg., chron. hist., Mottelay (very full) * Apr 18-Dec 26-**91**, Jan 2-Feb 27, Sep 3, pors. * 10-Oct 22-Dec 31 etc. -**92**; the phonopore, Langdon-Davies *Sc Am Sup* * May 18 *The Eng* * June 21-**89** *El Wld* * Mar 7; and teleph. indiv. selection on elec. circuits call sys. * July 11; Gov't., Rosewater (full) Dec 12, Gov't. control, Foote, 19 -**91**

El Wld pictorial, Trotter * Jan 16; the Wentz line adjuster, Rosenbaum * Feb 20; lines earth cur. disturbs., Finn * May 14; cable relays, Judd * Nov 5-**92**; multiplex, the phonophore *Eng* * Apr 19; at Paris exhib. * Aug 16, 23 * Oct 11, Post Office, Oct 25, Nov 1-**89**

E News the Am. inventors of the, ed. Apr 14, birth of the elec. 21; the Finley helio-teleg. 28-**88**; trans-Atlan. cable lines * Mar 29; the world's lines, Oct 25; cables, internat. sys., Henniker, 25-**90**

Telegraph

F Inst the writing, Gump, Oct -**88**; cable, Delaney * July, (full) *Sc Am Sup* * Aug 31 * Sep 7-**89**; foreign curs. balancing effects, Fletcher *Inst C E* * v 94 -**88**; sub. cables resist. measurement, Rouillard, abs. v 95 -**89**; sub. Pac. cable, projected *Locom* Nov -**91**; Gill-Alex. indiv. call *R Gaz* * Mar 13; secret service indiv. call * Aug 28-**91**

Sc Am Sup Morse and first line, Feb 25-**88**; trans-atlan. cable lines * Apr 26-**90**; transmiss. of messages through the air without wires, Trowbridge * Feb 21; between Great Brit., Europe, Am. and the East, Niven * Mar 28; first message, Vail, Nov 14-**91**; of to-day, Buckingham *Scribner's* July -**89**

CHINA, and R's, Hitchcock *E News* * Nov 17-**92**

DELANY'S sys. of private line *El Eng** July 20-**90**; aut. *El Wld* * Feb 2; line adjusting *R Gaz* * Nov 1-**89**

EUROPE, Gov't. tels. of, Rosewater *El Eng* Dec 9, dis. 16; Niven *Sc Am Sup* * Mar 28-**91**

MERCADIER multiplex sys., abs. *Inst C E* v 106 -**91**

PARIS-New York Co. *El Rev Lond* July 29-**92**

PATTEN'S multiplex sys. *El Wld* * Jan 26, (full) * Feb 23, dis. Mar 9-**89**

POSTAL, Brit. Post Office *El Rev Lond* Apr 5-**89**; *El Rev* Dec 5, Gov't. control, Rosewater, dis. (full) 12; Great Brit. sys. *The Eng* * Dec 18-**91**. See also POSTAL telegraph

SPECTRO-tel., Dresing *El Rev Lond, El Wld* * July 21 *Sc Am Sup* * Aug 4-**88**

STENOTELEGRAPH, the Cassagnes (stenography at a distance), Chenut *El Wld* * July 19 *Sc Am Sup* * Aug 16-**90**

TYPE printing, Wright & Moore's *El Rev Lond* * Mar 1 *Sc Am Sup* * June 8-**89** *Iron*

WESTERN Union Co., U. S., reports *El Eng* Nov -**88**, Dec -**89**, N. Y. equip. (full) Jan 27-**92**; reports *El Rev* Oct 19-**89**, Oct 22-**92**

WEST Indies, competition map *El Rev Lond* * Dec 26-**90**

Telegraph Engr. Soc. pro. *El Rev Lond* Jan 13-27, Feb 3, 17, 24, Mar 2-16, 30, Apr 20, 27, May 4, 18, 25, June 18; *Eng* May 25-**88**

Telegraphophone, the Wheless *El Wld* * Sep 14-**89**

Telemeter system *El Wld* * Sep 21-**89**; Fiske's (marine dist. instrum.), Brylinski, abs. *Inst C E* v 106 -**91** * *An Telegr* -**91**; Gautier's pocket (rapid dist. measuring), Robbins *Tech Q* * May -**89**

Telephone *El Eng* transmitting speech by interrupted elec. curs., Kintner * Jan *El Rev Lond* * Jan 20, 27; and electric light and power circuits, elec. relations, Lockwood *El Eng* Oct -**88**; interference cases (very full) Mar; induced cur. strength with magneto-teleph. transmitter, Cross, May -**89**

El Eng induction * Jan; eng., Carty, May 21 *El Rev* May 24; spec. induc. capac., Jacques *El Eng* Oct 1-**90**; inductive disturbs. in circuits, Carty * Mar 25, dis. Apr 15 *El Rev Lond* Apr 10 *El Rev* * Mar 28, *El Wld* * 28, dis. * Apr 11 *Sc Am Sup* * May 9, expts., Kennelly *El Eng* * May 6, 13-**91**; signals, selective or indiv., Lockwood * June 8 *El Rev* * June 18 (full) *El Wld* * 11; eng., Webb *El Eng* * Sep 7; connecting stations with exchange office by single line, Zetsche * 21-**92**

El Rev Lond batteries, Pickernell, Oct 19 *El Rev* Sep 15-**88**; telephony, Hibbard *El Rev Lond* Oct 18; induction, Carty * Dec 6, dis. *El Rev* * Nov 30 *El Wld* * 30 *Eng* * Dec 20-**89**; French *El Rev Lond* Jan 10; exchange construct., Pickernell, Oct 17-**90**; receiver, influence of strength of magnet in, Cross * Feb 20; telephoning great cities, Bennett (full) * Sep 4, 11, 11, ed. Oct 2, 16, Nov 13 *Eng* * Sep 11; and telegraphy, prog. in England, Preece *El Rev Lond* Sep 18-**91**; domestic telephs. * May 13-27-**92**

El Rev limits of speaking teleph. lines, Wietlisbach, May 18; Paris exhibit, Sargent, Sep 21, convention, 21; Enzmann's telephonic relay and phonopore * Nov 2-**89**; principles underlying acoustic telephony, Cross, Feb 8; convention (full) Sep 20; Co's corporate organization, Hall, 20; Root's (box) aut. pay station * Nov 22-**90**; the McCluer toll-box * Jan 24; telephony, new method of study, Cross, Feb 7; and telegr., inventors of, Gray addr. Apr 18 *El Wld* 25 *E Mag* June 20 *Sc Am Sup* 20; first exchange, New Haven, Ct. *El Rev* Jan 2; ten years with, Barrett * Feb 20-**92**

El Wld telephony, Touanne, Sep 14-**89**, duplex, Oct 23-**86**, Jan 4-**90**, Barrett * Jan 18; submar. cables for long dist., Preece, Oct 4-**90**; disturbs., Kennelly, Apr 11-**91**; U. S. indus. June 18; Co. operating, Foote, July 9-**92**

E Mag chat with Europe, Webb, Apr -**91**; indus. future, do. Mar -**92**; teleph.-equation, Madsen, abs. *Inst C E* v 95 -**89**; effects, intensity and equality, Mercadier, abs. v 108-**92**; elec. boxes *Sc Am Sup* * Jan 21; interferences of dynamo curs., McCluer, Oct 13-**88**; telephone girl, Nelson, Feb 20-**92**

Telephone

Teck Q magneto transmitter, strength of induced cur., Cross * Feb -**89**; magneto receiver, influence of strength of magnet, do. * Nov -**90**; telephony, studies in Rogers lab. of physics, Mass. Inst. Tech., do. *Soc Arts Mass* -**89**; new method of study in, do. -**91**

ALBANY, Hudson river Co. *El Rev* * Dec 10-**92**

AM. Bell Co., report *El Eng* Apr, decis. May -**88**; reports *El Rev* Apr 7-**88**, Apr 6-**89**, Apr 5-**90**, Apr 11-**91**, Apr 9-**92**; U. S. vs., pat. decis., law (full) *El Wld* Mar 24, 31, (full) *El Rev* Mar 31, May 5 *Sci Am* Nov 24; reports, Apr 7-**88**, Apr 6-**89**, Apr 11-**91**

BELL'S water-jet transmitter, Tunzelmann *El Wld* * Aug 11 *Sc Am Sup* * Sep 8-**88**

BERESFORD, the *El Rev Lond* May 27, June 10-**92**

BOSTON exchange *El Rev* * Aug 1-**91**

COLLIER audible *El Wld* * July 18-**91**

DENVER, induction and interference with service *El Eng* Apr 16 -**90**; system *El Rev* * Feb 9-**89**

DETROIT Exchange Assoc. *El Eng* Sep 17-**90**

EDISON'S carbon pats. *El Rev* * May 14 *El Wld* * 14-**92**

GRAMOPHONE, Berliner *El Eng* * Dec 31-**90** *El Wld* * Jan 3-**91**. See also GRAMOPHONE

HOWARD'S ap. *El Rev* * Oct 31-**91**

JACQUE'S sys. of simul. telegr. and telephony *El Wld* * Nov 17-**88**

LONDON-Paris, Eng. Channel submar. line, Preece *El Rev Lond* * Aug 28; Webb *El Rev* Mar 28, Apr 11, Preece * Sep 26 *El Wld* * Oct 3; *Eng* Mar 20, Preece, Sep 4 *Sc Am Sup* * Oct 3 -**91** *El Eng*

LONG distance, 950 miles. Dickson *Cassier's* * Nov; Webb (full) *El Eng* * May 4, 11; N. Y. - Chic. line, eng. details, Wetzler * Dec 14; 1,000 miles by, N. Y. - Chic., pors. *El Rev* * Oct 29; Neilson *El Wld* July 9; *Sc Am Sup* Jan 9-**92**; *Locom* May -**88** *El Rev*

MICROPHONE, evolution of, Tanner *El Wld* * Dec 13 *El Rev Lond* * Nov 21; transmitter, excursion of electrodes, Cross, Oct 31 *Tech Q* Aug *El Rev* Nov 1-**90** *Tech Q*; Blake contact expts., Patterson *El Rev* May 5 *Tech Q* Feb -**88**; Barrett *El Rev* Mar 19-**92**; transmitter, Berliner pat. (full) *El Wld* * Nov 28, 28-**91**; cur. strength, Sabine, Cross *Tech Q* Feb -**89**. See also MICROPHONE

Telephone, NAT. Exchange Assoc. pro. *El Eng* Oct (full) *El Rev* Sep 15-**88**; *El Rev Lond* June 7-**89**; (full) *El Wld* Sep 15-**88,** Sep 21-**89,** Sep 20-**90**

NEW England Teleph. & Telegr. Co. reports *El Rev* May 18-**89,** May 17-**90**; quarters *El Wld* * Aug 1-**91**

NEW York city, service *El Eng* * Sep 10-**90**; underground wire work *El Rev* * Mar 16-**89**; Met. Exchange * Sep 13-**90,** station *Sci Am* Mar 30-**89**

PHILA. Bell Co. plant (full) *El Eng* * Feb 10, report, Apr 6 -**92**

PULSION, the *Eng* * Dec 6-**89**

ROSEBRUGH duplex system *El Wld* * Jan 4-**90**

SWEDEN & Norway *El Rev Lond* Aug 1 *Eng* Dec 12-**90**

SUTTON'S system *Sc Am Sup* * Feb 28-**91**

SWITCH-board, Vail & Seely's *El Rev* * July 14-**88,** McClure's multiple * Feb 21-**91**; switching, Wordingham, inset *Inst C E* * v 100 -**90**

UNITED Co., an. meeting *El Rev Lond* July 6-**88,** report, June 7-**89**

VAN Size's exchange system *El Wld* * Dec 8-**88**

Tele-photography, Sutton *El Rev Lond* * Nov 7-**90**

Telescope grinding machine, Common's 5-ft. mirror (full) *Eng* * Oct 28 * Nov 4, 11, inset, 18, 25-**92**

Telescopes, hand, for stadia work, Richards *Am Min* * v 20 -**92** *E & Min* * May 14 *Sc Am Sup* * June 11-**92**; object glasses *Sci Am, Eng* * Jan 6; for stellar photog. * Apr 27; astronom., clock driving ap. for, Grubb * Oct 5 *The Eng* Aug 10-**88**; hist., Holden *Sc Am Sup* Jan 21; Manchester exhib. * 28; great, of world, Rees, Mar 3-**88**; pyrometric * Mar 1-**90**; Lick equatorial 36-in., Keeler *The Eng* July 6-**88**

Telpherage, two rope haulage systems, Norris *Am M E* * v 12 -**91** *E & Min* * Aug 8, 15; aerial wire ropeways, Pohlig, inset (full) *Am Min* * v 19 -**91**; cable transfer for R. cars, Spilsbury * v 20 -**92**; and elec. R's of Edinb. exhib., Manville *El Rev Lond* Oct 17-**90**

El Rev elec. transport., Parcelle * Aug 9; double track elevated elec. wire road, for mining and mills *El Wld* * Jan 4-**90**; Sprague elec. aerial tramway *E & Min* * July 28-**88**; Lidgerwood suspen. cableway, Ogden mines, N. J. * Oct 10-**91**

E News the Portelectric carrier, May 25-**89**; Suspen. Transport. Co., Chandler's pat. wire ropeway * July 12-**90**; Plomo-

Telpherage
sas wire ropeway, McIntire * Mar 21 *Sc Am Sup* * Feb 21 *R Rev* the Garrucha aerial, Spain * July 25 *R & Eng* * Aug *Industries;* suspen. cableway at Austin dam, Tex. *E News* * Nov 14-**91**; long span wire rope, Howland, Me. * Apr 2 -**92**

Inst C E Gourjon system wire ropeways, Gros, abs. v 93 -**88** *An Ponts* * v 14 -**87**; Beer system, Raoult, abs. *Inst C E* v 95 -**89** *Rev Mines* v 3 -**88** *Sc Am Sup* * Dec 15-**88**; Ayrton, Perry, Jenkins', at Glynde, England, Fernald *Pop Sci* * July -**90**; wire rope transport. and transmiss. *R Gaz* * Oct 7-**92**

Sc Am Sup Otto pat. wire ropeway (full) * June 22-**89**, Gottesegen coll., Silesia, *The Eng* Dec 28-**88**, inset * Jan 25 * Feb 8, 8-**89**; Ry., elec., Edinb. exhib. * July 11 *Sc Am Sup* * Aug 30-**90**; aerial, Landun sugar works, France * June 13-**91**. See also ELEC., Portelec; ROPE driving; WIRE rope

Tempel, William, Schiaparelli *Sc Am Sup* July 13-**89**

Temperatures, at various depths, L. Cochituate, Boston, diag. *E News* * July 26-**90**; absolute zero *R Gaz* Sep 30-**92**. See also EARTH temps; THERMOMETERS

Tennessee and Ala. *Eng* * Oct 5 * Nov 2-**88**

Tesla, Nikola, por. *El Wld* * Feb 15-**90**, and his business *Sc Am Sup* * May 21-**92**

Testing machines, aut. recording ap., Gray *Am M E* v 13 -**92** *Cassier's* * Oct -**92**; the Emery, Towne *Eng* * May 11-25, 75-ton, inset * July 6, dis., insets (full) *Inst M E* * May, Oct, at Watertown arsenal *The Eng* Jan 20-**88**

Eng Kennedy's 50-ton laboratory * Sep 12 *The Eng* * July 18-**90**; hydr., 1200 tons capac., Phœnix I. Co., inset *E News* * Jan 10; the Olsen and com. report *F Inst* * Feb; alternative-center, Walker eng. lab., Liverpool, Hele-Shaw, insets *Inst M E* * July -**91**

Testing materials, uniform methods, com. report *Am C E* v 26-**92**; and sampling works, St. Louis *E & Min* * Feb 11-**88**; standard methods *E News* Mar 7, Aug 22; Kirk system, Hunt, Sept 19-**91**; Malines Gov't. works, Belgium, Roussel *Inst C E* * v 91 -**88**; metals, influence of time in, Bauschinger (full) v 107-**92**; Charlottenburg station, Germany *R & Eng* Aug -**90**; labs., Master Mech's com. report *R Gaz* June 26-**91**; repeated stress, expts., Sondericker *Tech Q* * Apr -**92**. See also BEAMS; CAST iron; MATERIALS, inspection; STEEL, expts.

Texas, geological survey *E & Min* Apr 5-**90**
Theatre, Terry, Court and Garrick, structural ironwork in, London *The Eng* * Feb 1-**89**
Thermic motor of the future *Sc Am Sup* * Apr 25-**91**
Thermo-dynamics, difficulty, Mansel cor. *The Eng* Nov 1, n 15-**89,** Bower cor. * Aug 5, Sep 23 * Dec 2-**92**
Thermograph, Draper's *Eng* * Feb 14-**90**
Thermometers, mercurial, expts. to det. rate of rise or fall, Nagle *Am M E* * v 13 -**92**; new scale, Forbes *E Wld* Oct 12-**89**; correcting *Locom* Dec -**88,** Jan; Browne (full) *Sc Am Sup* * Sep 14-**89**; calibration method at many points, Holman *Tech Q* * Sep -**87**
Thermo-motor, the Hargreaves *The Eng* Jan 27; and heat engines, R. H. Smith, Feb 3-**88**
Thomas, Edward C. G. *Inst C E* v 99 -**90**
Thomas, Sidney G., bk. review *E & Min* Aug 8-**91**
Thompson, Silvanus P., por. *El Wld* * Jan 9-**92**
Thomson, Elihu, por. (full) *El Wld* * Sep 1-**88**
Thomson, James *Sc Am Sup* July 9-**92**
Thomson, William, por. *El Eng* * Jan 13, por. *El Wld* 16-**92,** por. (full) *Sc Am Sup* * Mar 9-**89**
Thorman, Edward H. *Inst C E* v 109 -**92**
Thrashing machine trials, Doncaster *The Eng* * June 26, July 3, 10-**91**
Thurston, Robert H., por. *Cassier's* * Nov -**91**
Tide gauge, aut. self-registering, n *E News* * July 28-**88**
Tides, tidal volume, d'Auria *F Inst* * Apr, law of variation * May; range in rivers and estuaries, Gieseler, Aug -**91**; the bore of the Tsien-tang-Kiang, Moore *Inst C E* * v 99; continuous util. of tidal power, Decoeur, abs. v 102 -**90** *Genie Civil* v 17 -**90.** See also WAVE motors
Timber, expan. due to water absorption, De V. Wood *Am M E* * v 10 -**89**; preservation, ed. *Eng* Nov 21-**90**; use in eng. structures, Apr 1-**92**; mine tim. preserv. *E & Min* May 30-**91**; supply vs. R. consumption, Fernow *E News* Oct 25; preserv., Chanute, Dec 13, report (full) *R Gaz* Dec 12-**90** *Sc Am Sup* Feb 14, treatment *The Eng* Sep 11, creosote for, Jan 31; Gov't. tests, J. B. Johnson, Nov 28-**91**; preserv. *E Rec* Dec 20 -**90**
Inst C E expts., want of uniform system, Campbell, abs. v 92; creosoting in New Zeal., Sharp * v 93 -**88**; in tropics, the

Timber

[illegible] Canada [illegible] Wine [illegible] James v 102 -**91**; pine, [illegible] E Eng [illegible] 92 preserv. Lond E Gaz Sep 19, [illegible] Dec 23-90; [illegible] scientific study of J. B. Johnson Dec -91 [illegible] on some of its diseases. Ward Bull Sc Am Nat Jan 7 24 [illegible] Mar 7 * June 2 * July 25 * Sep [illegible] 29-90 [illegible] also Durability, strength Wood

Timber uniform [illegible] [illegible] v 28 -**92** R Gas Jan 29-90 [illegible] 29-92; [illegible] keep. Binsse [illegible] 1 [illegible] * 90 [illegible] Brunner El Eng July 2-**90**; [illegible] J. Brown E Ind June 30 F Inst June. [illegible] Eng [illegible] 90; Hartmann's system El [illegible] * [illegible] 1-90; [illegible] system. Gardner. July 30 E [illegible] Nov 2-92

E Mag [illegible] methods in seasoning, Fleming * May -**91**; [illegible] 24 hours system E [illegible] * Aug 27-**89**; correct. simple method in seasoning Lucas Nov -**88**; standard and 24 hour sys. [illegible] Eng Nov -**88**, uniform. May -**92**; convention [illegible] Nov 12-**88**, [illegible] new method. Richardson Sc [illegible] Sup * Jan 12-**90**. See also Kiln time convention

Timber measuring machine, the Llewelyn E News * Nov 16-**89**

Tin, assay, influence of Columbite in. Carpenter Am Min v 17 -**89** comm. p 56; [illegible] assay. Bouman. v 18 -**90** Tech Q May, Aug -**90**; alluvial deposits Siam. Summers. Kicker full n p 772 [illegible] * v 29 -**92**; tin and the tariff. Fletcher Sun Traveller Jan 1-**88**; production. E Eng July 18-**90**; world's store. Claygate E Mag * Jan [illegible] on plate mfrs. and English exports. n Mar -**92** [illegible]

E & M [illegible] mines Sep 13-**88**; mines. Malinon * Aug [illegible] in N. [illegible] Dec 14-**89**; produc. Aug 30; San [illegible] mines. [illegible] Benedict Oct 18-**90**; in '89 Jan 4-**90**, in '90 Jan 1; in [illegible] Tex. Comstock 24; on plate manuf., Garrison. [illegible] Feb 28-**91** E [illegible] Dec -**90**; recov. from tin plate scrap, new method. Schulze. [illegible] Test C E v 102 -**90** E & Min Mar 28; Bolivia mines. Minchin. May 16; U. S. tin plate indus. Dec 12-**91**; market. [illegible] Jan 2; ore concen. plant at Harney Peak, So. Dak. * July 30; mines do. Nov 26, Dec 3-**92**

E News Am. mines. Emmens. Nov 24-**92**; produc. Sc Am Sup Aug 9-**90**; sources of. Merrill. Nov 28; hist. of discov. and use of. Flower. Dec 5-**91**

Tin plate cleaning machine. Davies' E & Min * June 27-**91**

Tires, Munton proc. manuf. steel, Chic., inset *Eng* * Oct 17-**90**

Tobacco, use of, anal. (effect) Bosworth *Sc Am Sup* Apr 27-**89**; (effects) Rochard, Sep 10-**92** *Pop Sci*

Tools, cast iron, for cutting metals, O. Smith *Am Min* * v 19-**91**

Torey, Hamilton *Inst C E* v 98 -**89**

Tornadoes, in U.S., Hazen, notes *E News* Apr 12-**90.** See also STORMS; WIND

Torpedo boats, the Halpine *El Rev* * Oct 19; Sims-Edison fish * Nov 16; Peral submarine, Webb *El Wld* Oct 19-**89**; Fatum, Italian, inset *Eng* * Jan 20 *Sc Am Sup* * Feb 25; 2d class, Yarrow *Eng* * Apr 27-**88**; Donaldson, Feb 22; Spanish trials report, Mar 29, Apr 12, 19; seaworthiness of, Hovgaard, July 26; Ital. navy * Dec 6; Brit. navy * 20-**89**; Sunderland, b. with petrol. fuel, indic. diags. inset, * Jan 10, Mansel cor. 24, (full) *Sc Am Sup* * Feb 22; Yarrow's, Dec 20 *Eng* * Nov 21-**90**; Brazilian navy, sea-going * Sep 18-**91**

E News the 'Cushing,' trials, Jan 2; U.S. navy, inset * May 12-**92**; English *R & Eng* Feb, Mar; Nordenfelt submarine * May *The Eng* Mar 16-**88**; Ital. navy *R & Eng* * Feb -**90**; Baker submar. * July -**92**; French, No. 110 *Sc Am Sup* * May 4; No. 1, structural strength, Drake (full) * June 29 * July 6, correction, 13-**89**; Nibbio, Ital. * Feb 1-**90** *The Eng* Mar 30-**88**; standard, Sep 20-**89**; Turkish Gov't. * Jan 10; Tartar class * Nov 14, ed. 21-**90**; French * Jan 30-**91**, July 15-**92**

Torpedoes, the Howell locomotive *The Eng* Aug 17 *Eng* * Jan 20; Berdan system * Feb 3; Grenfell, ed. Apr 27; tor. attack, Jaques, Dec 21-**88**; the Victoria * Aug 29 *Sc Am Sup* * Oct 11; Whitehead & Howell aut., Ellicott *Eng* * Nov 14, 28 * Dec 19, 26-**90** *The Eng* * Aug 7-21; Sims-Edison elec. *Eng* * May 1-**91** *Sc Am Sup* * May 3-**90** * Mar 5-**92** *The Eng* * Dec 18-**91**; Canet, discharge tubes (full) *Sc Am Sup* * Sep 21-**89** *Genie Civil;* marine locom. *The Eng* Feb 24-**88**; the Lege * Apr 12-**89**

Torpedo placing machine, the Fox *R & Eng* * Feb -**92**

Torpedo thrower, aerial, Graydon air gun *Sc Am Sup* * Dec 15-**88**

Towers, Egyptian, light, Minneap. exhib. *El Eng* * Sep 17-**90**; Judson, 1600 ft. *Eng* * Nov 15-**89**; London, great, proposed, ed. May 2-**90**; iron, Frankfort Elec. exhib. * Aug 21; U.S. Columb., Chic., Morison's 1120 ft. * Nov 20 * Dec 18 *E News* * Dec 5-**91** *R & Eng* * Jan -**92** *R Gaz* * Dec 4-**91**

Towers

E News [illegible] N. Y. Crystal Pal. exhib., 1853, New [illegible] Tompkins [illegible] Isle of Wight. Dec 7–**89**; braced iron, [illegible] * June [illegible]–**90**: wind strains in graph. det., Steiner * Mar [illegible] framing proposed. Hagenny [illegible] * Apr 25: Hastings proposed. [illegible] exhib., [illegible] Aug 1–**91**

E Rev water [illegible] Pullman, [illegible] * Dec 28: church spire framing and machinery * Jan 13–**89**, steeple * Dec 20: London great, designs * May [illegible] prize * July 5, Shaw's proposed * Aug [illegible] iron, [illegible] tower construct. * Dec 6, prize designs *E & Eng* * Aug –**90**: U. S. Columb. exhib. n *R Gas* Oct 23–**91**: tower of Babel, Kircher *Sci Am Archit ed* June –**88**

Sci Am Sup London great, proposed, designs * June 7, 1250 ft., Davey * July 19–**90**: Proctor steel. U. S. Columb. ex. * Apr [illegible] steel, beam, proposed, O. Smith * May 30: Lond. Eiffel, Maxwell & Tilke design, n * Aug 8–**91** *Bld News, Industries;* Lond., designs, 1250 ft. *The Eng* * May 2, 1550 ft., Ende, 1300 ft., Woodcock, Fairbx * 9, 8, 1250 ft., Davey * 23 * June 6, 1400 ft., R. H. Smith report * 29, 1200 ft. Stewart (prize) * 27, 1300 ft., Webster, 2d prize design * July 4, 1300 ft., Graham * Aug 15–**90**. See also CHIMNEYS; MONUMENTS; STANDPIPES

EIFFEL, Paris, 1000 ft. *El Wld* * Apr 20: copyright, ed. *Eng* Apr 13: full * May 8, compared with Forth br. * 3: elec. plant * June 21: lifts * July 5–19; *E & Min* * Feb 2: inset *E News* * June 8–**89**: *E Rev* * Dec 15–29–**88** * Apr 13 * May 18, 25 * June 1–**89**: pressure gauge, Nansouty, abs. *Inst C E* v 105 –**91** *Genie Civil* * v 18–**91**; lifts, Ansaloni, insets *Inst M E* * July: *R & Eng* Mar: top of *Sci Am* Mar 9: *Sci Am Sup* * Apr 27 * June 15 * July 6, 27: top of *The Eng* * Jan 4–18, hydr. elevators, Roux * Mar 22 * May 10–**89**

Towns, new (boomed), failures in, Fleming *E & Min* * Feb 13, 27, Mar 19, 26, Apr 2, 16, 30, May 21, 28–**92**

Townshend, Richard *Inst C E* v 93 –**88**

Track, railroad, expense of maintenance on wooden and metal ties. Post, dis., insets: English, Tratman, insets *Am C E* * v 18, 18 –**88**, do. and Cunningham dis. v 20 –**89**, imp., Am. development, Tratman, insets (very full) * v 22–**90**, do. Watkins, insets * v 22 *Eng* * June 10 * July 1, 22 * Aug 12 * Sep 23 * Oct 14, 21–**92** *The Eng* * Oct 17; construct. and maintenance, Hall, dis. *Am C E* * v 23 –**90**

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E News N. Y. Cen. standard stone ballasted road-bed * May 19; English, Tratman, July 7, Cunningham (Soc. pro.) Mar 16; the Servis tie-plates, 16, the Stuart * Apr 27; imp., Tratman * 27, July 20; track laying, cost, May 25; Dudley's inspection diags. * June 15; Goldie & Fennerty's grooved spikes, holding power * Nov 23-**89**

E News the Davies steel lock spike * Apr 19; positive nut-lock, Jeffersonville, O. * Sep 6; maintenance, Reed * Aug 30, Hall, Dec 13; Bush interlocking bolts * 20-**90**; B. & O. standards and rules * Oct 31; rail section, So. Austral. Gov't. R. * 31; spikes, tests of various forms, Cox, Dec 5-**91**

E News Young reversible nut-lock * Apr 16; Haarman (German), bk. review, July 28; protect. against torrents and earth-slides in Sicily, Italy * Sep 15; Prussian St. R's * Nov 17-**92**; German & Austria-Hungary R's per. way, W. Worthington, abs. *Inst C E* v 95 -**89**; double gauge, 3-rail turnouts for, Geddis (full) *R & Eng* * Apr – July -**92**

R Gaz car wheels, axles and, N. E. R. Club dis. Feb 17; per. way, circular returns, Apr 13; mainten. (cost), Goodwin, May 4, Curtis * Nov 16-**88**; stone ballast in India, May 3; Am., English and Indian practice, notes, Oct 11; track work, Nov 8-**89**; Jones safety nut lock, n * Oct 3-**90**; longitud. bearings for, T. C. Clarke, May 29-**91**; N. Y., New Haven standard * Jan 1; tie plates, Sandberg * Mar 25; nut locks * Nov 11-**92**. See also CROSSTIES; R's, curves — spikes — switches — U. S. construct; RAILS, joints — sections

Track jack, the Fisher duplex, n *E News* * Aug 30 *R Gaz* * Sep 5-**90**

Traction, det., h. p. of tabulated constants, Crane *El Eng* Nov 19-**90**

Traction engines, England, descr. and construct., Fletcher *E News* * Oct 27, ed. Nov 10, and steam road rollers, 10, * Dec 1 -**92**; spring wheel *The Eng* Dec 7-**88**. See also ROAD engines; STEAM carriage

Trade, England and Am. relations, McCormick, ed. *Eng* Apr 8-**92**; Am. and foreign exports and imports *E News* Apr 14-**88**

Trade-marks, law of, Sebastian, bk. review *Eng* Dec 19-**90**

Trade schools, N. Y., work in, Mead *E Mag* * Apr -**92**; J. Wilson *F Inst* Feb-Oct; N. Y. *Sc Am Sup* * Dec 20-**90**

Trade unionism, new and old, Howell, bk. rev. *Eng* May 1-**91**

Trade-winds, cause of, Velschow, dis., insets *Am C E* * v 23 -**90**

Tramways, Guinness' brewery, Georghegan *Eng* * Oct 12, insets *Inst M E* * July -**88**; the Hunt industrial *E News* * June 16 -**92**; tramway wagon with steel rails, Wells, descr. *Lehigh Eng J* Apr; steam, for country districts *The Eng* Oct 26, Nov 16-**88.** See also R's. elec; STREET R's.

Trans-Caspian territory. See R's, Trans-Caspian

Travertine deposits, Mammoth Hot Springs, Yellowstone Park, Weed *E & Min* * June 13-**91**

Trellis machine, steel *Eng* * July 25-**90**

Trench brace, Dunn extensible *E News* * July 7-**92**

Trestles, and pile structures, Western Am. R's, inset *Eng* * May 20-**92**; C. B. & N. standard plans *E News* * Apr 7, May 5, June 9; round timber, Burnt Br. creek, Vancouver, Klickitat & Yakima R., Habersham cor. * 9; Norfolk & W. stand. plans * 23; special features in wooden, cor. July 21; design of, ed. 21 -**88**

E News timber, for R's., Palmer, July 13; Cleve. & Canton frame * Nov 2; Wheeling & L. Erie timber * Dec 7-**89**; 24° curve on R., Paddock * May 10-**90**; Can. Pac. designs * May 2-**91**; pile bridges, cost of repairs, Talbot *E Rec* Sep 20-**90**; and scaffolding, Ziegler's sys., com. report *F Inst* * Aug -**88**; R. trestle work, Jameson (full) *R & Eng* * Dec -**89** * Jan -**90**

R Gaz safety of pile bridges, Apr 26-**89**; wooden bridges, Foster, Or. & Wash. Ter. R. * Apr 25, Ft. Worth & Den. City stand. * May 30, St. P. & Man. * June 13, 27 July 18 Aug 1, 22 Sep 5, 19 * Oct 31 * Nov 21, 28 * Dec 5, 12-**90** * Jan 2, 30 * Feb 13; Esquimalt & Nanaimo high * Feb 6; Minneap. & St. L. pile and, Hixon cor. * Apr 17; Intercol. R. of Can., deep water * Oct 2; Halifax har. do., pile * Dec 25-**91.** See also BRIDGES, floor-beams and pine stringers, Bates — pile; PILING; PILES

Trickett, John *Inst C E* v 95 -**89**

Trigonometer, Leschorn, diag. *E News* * Nov 24-**88**

Trigonometry, graphical, Foster *E News* * Aug 31-**89**

Triple thermic motor, Haswell *The Eng* June 1-**88.** See also THERMIC motor

Trobe-Bateman, Frederick F. *Inst C E* v 96 -**89**

Trowbridge, William P. *Am M E* v 13 -**92,** por. *E & Min* * Aug 27, por. *Sc Am Sup* * Nov 19-**92**

Trusts, and the law, C. Brown *El Eng* June 25; Am. and English, ed. *Eng* Aug 29-**90**

Tubes and tubing, rolling from solid bars *F Inst* Dec *Locom* Dec *Sc Am Sup* Dec -**90** *Am M E* v 8 -**87**; flexible metallic, Almond * v 12 -**91** *Eng* * Jan 16-**91** *E & Min* * Dec 6 *E News* * Nov 15-**90** *R Gaz* * Nov 15-**89** * Nov 28-**90** *Sc Am Sup* * Jan 10-**91** *The Eng* * Oct 18-**89** * Dec 30-**92**; spirally welded steel, Bayles *Am Min* * v 16 -**88,** v 19 -**91** *E & Min* * Apr 7, 14-**88** *E News* * Mar 30-**89** *F Inst* * Feb -**88,** abs. *R & Eng* * Mar -**89** *Sci Am* June 16-**88** *Sc Am Sup* Nov 8-**90** *Eng*

Eng flexible metallic, Cammell's * Oct 11-**89**; seamless tubes rolling, F. Siemens * Sep 21 *Sc Am Sup* * Nov 10-**88**; the Hartz tube welding machine *E & Min* * June 21; Mannesmann seamless pipe molding proc., Wedding, June 14, Dec 27, weldless, manuf. *E News* * Aug 2 *F Inst* Dec, rolling proc., Siemens *Locom* Dec -**90** * Jan -**91** *Sc Am Sup* * Mar 24 * May 12-**88,** Gordon *The Eng* June 27-**90**

E News manuf. of copper by electricity, Elmore's Aug 9-**90**; spinning, shaping and welding metals, Bevington's proc., com. report *F Inst* * Nov -**91**; spiral weld machin. development, Green, inset * Mar -**92**; manuf., Robertson cor. *The Eng* Sep 28-**88**; tube making machin., Baraclough * Oct 23-**91.** See also PIPES

Tug boats, Kathleen screw, inset *Eng* * Jan 31 *Sc Am Sup* * Mar 8-**90**; Noordzee & Oostzee screw *The Eng* * Sep 2, 9-**92**

Tunnels and tunneling, Rap. Tran. Commiss. report to Mass. Legislature, Apr 5-**92**; ventil of, Eayrs, *E Rec* Feb 28-**91,** dis., insets *Am C E* * v 23-**90**; R., covering ironwork protect. from corrosion, Dagron, dis., inset; method of alignment, Dunham, dis. * v 27, 27 -**92**; R., deep, ed. *Eng* Apr. 10; Transandine R. tunneling plant, inset * Apr 24 * May 22 *R & Eng* * June -**91**; in loose ground, Deacon *Eng* Aug 12-**92**

E Mag mod., Moir * Sep -**91**; building difficulties, Low * May -**92**; cost of tunneling at Hogsback mine, Placer Cty, Cal., Ralston *E & Min* Aug 24-**89**; submar. and Hudson river tun. * May 10; timber, Comstock Co. report, Oct 18-**90**; Reno rap. tran. system, under sts. * Feb 21-**91** *E News* * Feb 27 * Apr 21-**92,** (full) *R Gaz* * June 12-**91**

E News rock, bottom vs. top heading in, Kahnbach * Mar 24; Can. Pac. R., sections, T. Thomson * Nov 24-**88**; suba-

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E Rec Mil. flushing (sewer) * Dec 8-**88**; arch, shield for removing, Caled. R. * May 7; tunneling in loose ground, Vyrnwy aq., Deacon, abs. Aug 27 *The Eng* 19-**92**; ventil., three Alpine, Pürzl, abs. *Inst C E* v 106 -**91**; relining, in use, the Saulzaie, Libeaux, n *R & Eng* * July -**89**; tunneling under heavy pressures, Schenck *R Gas* * Apr 10 * May 8; ventil. of, ed. Oct 30-**91**. See also BLASTING; EXPLOSIVES; MINES and mining; R's, underground; SEWERAGE and sewers, Brooklyn main relief; WATER-works, N. Y., Croton aq. excav., etc.

ALLEGHENY Portage R. *E News* * June 29-**89**

BALT. Belt Line, York road, inset *E News* * Jan 9 *R Gas* * Aug 5 *St R J* * Aug -**92**

BALT. & Potomac ventil. plant *E News* * Oct 20-**92**

BETCHWORTH, Dorking, Lond. & Br. R., repairing *E News* * Apr 20, Lopes *Inst C E* * v 95 -**89**

BIG Bull, Norfolk & W. R. *E News* * June 9-**92**

BLACKWALL highway, under Thames river, Lond. *E News* * June 16-**92**

BRAYE, France *E Rec* Jan 10 *R & Eng* Jan -**91**, Laonnois, abs. *Inst C E* v 99 -**90**

CHANNEL. See TUNNELS, English Channel

CHICAGO, sewage, proposed, Nott, cost *E News* Feb 9-**89**; river, cable R., inset * Feb 22, 22 *Sc Am Sup* * Mar 22-**90**; West Chic. st., inset *Eng* * Feb 26-**92**; Wash. st. * Aug 21 *Sc Am Sup* * Sep 19-**91**, alterations in, Tresise *E News* Dec 13; water-works, inset * July 5-**90**

CLYDE river, Glasgow, proposed *Eng* * Jan 17 *E & Min* * Feb 15 *E Rec* * Mar 29 *R & Eng* * Mar *Sc Am Sup* * Mar 15-**90**

COOSA mt., Geo. Cen. R., Dabney cor. *R Gas* * Aug 3-**88**

CROTON aqueduct, N. Y., surveying on Div. 6, Watkins, dis., insets *Am C E* * v 23 -**90**; excav. through soft ground, Carson *E & Min* * Apr 25-**91**, *The Eng* * Oct 24, 31 * Nov 7-21 -**90**

Tunnels, DULUTH, Minn., report *E Rec* Feb 21-**91**
ENGLISH Channel tubular, proposed, Reed *Eng* Aug 28-**91**; ed. *E News* Oct 25-**90**
GLASGOW, R. covered way, Glas. City and Dist., W. Wilson *E News* * Aug 25-**88**; Glas. harbor *R & Eng* * Oct -**91.** See also TUNS., Clyde
HARLEM river *E News* * Feb 18-**88**
HUDSON river *Eng* Oct 17-**90**; *E News* Oct 5-**89**; shield for * Mar 15 * July 19; segment erector * Nov 15; cast iron lining * Apr 12-**90,** ed. June 16-**92**; *R & Eng* * July; Burr *R Gaz* * Mar 14-**90**; *Industries*
IRISH Channel project, Lethbridge *Eng* Feb 20-**91**; *E News* Nov 22-**90**
KHOJAK, India *E & Min* * July 5, 19 *E News* June 28 *R & Eng* * Sep -**90**
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MERSEY, difficulties *E News* Sep 1-**92**
MEXICO, Valley of *E News* * Aug 10-**89**; Zumpango works * Nov 1-**90**
MILL of Ash, Caled. R. *Eng* * Mar 18-**92**
MILSEBURG, construct., Oberschutte, abs. *Inst C E* v 110 -**92**
MONT Cenis and St. Gothard, data, table *E News* Apr 13 -**89**
NEPEAN, New So. Wales, alignment of, Keele *E News* * Jan 19 -**89,** abs. *Inst C E* * v 92 -**88**
NEW York, Met. R., East river, inset *E News* * Mar 14-**91.** See also TUNS., Hudson river
NEW York & Long Is. *R Gaz* * May 9 *Sc Am Sup* * June 21 -**90**
NIAGARA Falls Power Co., Werner (full) *Cassier's* * June *E News* * Jan 9 * Dec 29 *Pwr* * Sep -**92.** See also NIAG. Falls util.
PHILA., of Balt. & O. R., construct. and cost, Thayer, inset *Am C E* * v 26 -**92**
ST. Clair, Pa., inset *Eng* * Nov 14 *E & Min* * Dec 6, and ed. (full) *R Gaz* * Sep 26, 26 *Sc Am Sup* * Aug 23-**90**; (Schuyl. Val. R.), Grand Trunk R., proposed *E News* * Jan 26-**89**; L. Huron * Oct 4; shield, inset * Nov 8, 8, 22, inset * Dec 6, hydr. mach. * 20 * 27, tools used for clay excav., eds. * 27 -**90**

Tunnels, St. Gothard, Switz., and Mont Cenis, data, table *E News* Apr 13-**89**; air of, Bechtle, abs. *Inst C E* v 100 -**90** *Schweiz Bauz* v 15 -**90**
St. Louis water-works *E Rec* * May 7, 21-**92**
Seine *R & Eng* * May -**91**
Severn, Walker, bk. n *Eng* Nov 30-**88**; Richardson *E Rec* June 4, 11, July 2-**92**
Simplon, Switz., projected, temps. of *E News* * Nov 1-**90**
Stampede or Cascade, No. Pac. R., McHenry *E News* * June 30-**88**; Hobart * Oct 3, 10, (full) *Sc Am Sup* * Nov 7-**91**
Suram, Trans-Caucasus R., Urquhart, inset *Eng* * Apr 5 *E News* May 11-**89**
Thames, Blackwall, England *E Rec* * May 28, (full details), inset *The Eng* * Mar 18-**92**
Vosburg, the *Eng* * Apr 6-**88**
Vyrnwy aqued., Liverpool *Eng* * June 17, 24 *E Rec* * July 16-30-**92**; arbitration, Sep 19-**91**
Washington aqueduct *E News* May 4, 11-**89**
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Zumpango works, Mex. *E News* * Nov 1-**90**
Turbines (water power), Krainische works, Assling-Sava, Carinthia, inset *The Eng* * Dec 4, insets *Eng* * Aug 28 * Sep 11-**91**; 5,000 h. p. Niag. Falls Power Co., ed., inset * Dec 23-**92**; turbine power, Freeman cor. *E News* Oct 5-**89**
Turnbull, George *Inst C E* v 97 -**89**
Turner, Barrow *Inst C E* v 94 -**88**
Turpentine, and its products, Davies *Sc Am Sup* Aug 17-**89**
Twist drill grinder, Griffith's *The Eng* July 20-**88**
Tyndall, George R. *Inst C E* v 96 -**89**
Type, relative frequency of letters and combinations *E News* July 27-**89**; casting machines, Ross *Pop Sci* Dec -**91**
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Linotype composing, Mergenthaler's *Eng* * June 28 *E News* * Mar 25-**89** * Apr 21-**92**, com. report, insets *F Inst* * Jan -**90**; N. Y. Tribune *Sci Am* Mar 9; *The Eng* July 12-**89**
Roger's Typograph *E & Min* * Dec 6-**90**

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Uline, Andrew B. *El Rev* Apr 16, por. * 23-**92**

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Units and nomenclature *The Eng* Sep 25-**91**. See also ELEC—MECHAN. units

Utah, So., sulphur deposits. Faber du Faur *Am Min* v 16 -**88**

Vacuum, motors. Paris exhib. *Eng* * June 14-**89**; pan, Manlove * Dec 21 *Sc Am Sup* * Feb 4-**88**; pump, the Beacon, for exhausting incand. elec. lamps *El Eng* * Mar 4-**91**, Berrenberg's do. *El W'ld* * Apr 26-**90**. See also PUMPS, vac.

Valve gears. Edward's (launch engine) *Eng* * Dec 30-**92**; Rand's mechan. air *E & Min* * Apr 12-**90**. See ENGINES—LOCOMS — PUMPING engines. valve gears

Valves, details. Nat. W-works Co., Sickels, inset *Am C E* * v 24 -**91**, and air chamber *E Rec* * Sep 19-**91**; Freeman's balanced (engine) *El W'ld* * Sep 6-**90**; and hydrant manuf., Chapman V. M'f'g works *E News* * Sep 15-**88**; Rand mechan. air * May 11-**89** *E & Min* * Apr 12-**90**; 24-in. water, loss of head due to, Kuichling *E Rec* Mar 5-**92**; Lunkenheimer Brass Co. novel straightway *R Gaz* * June 6-**90**. See also ENGINES, valves

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OPORTO, Portugal, inset *Eng* * Feb 14-**90**

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ROCHESTER, N. Y., hydraulics of Hemlock lake conduit, Rafter, inset *Am C E* * v 26 -**92**; san. protect. of water-shed, Tubbs *E News* Apr 28-**88**; *E Rec* Aug 16-**90**; * Jan 3-31 * Feb 7 -**91**
ROME, Italy, supply *E Rec* Jan 3; Hicke, abs. *Inst C E* v 104 -**91**
ROSARIO, Argent. Repub., Bruce, abs. *Inst C E* v 108 -**92**
ROTTERDAM, Port of, Strukel, abs. *Inst C E* v 93 -**88**
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ST. Helens, Kirby pumping station *The Eng* Aug 17-**88**
ST. Louis, Mo., settling basins, inset *E News* * Apr 18; inlet tunnel and tower, inset * July 4-**91**; extension * Feb 20; *E Rec* * Apr 9, 16 * May 7, 21 * Aug 6, 13 * Sep 3, 17 * Oct 22; building * Nov 12-**92**
SCOTLAND *Eng* Aug 29-**90**
SEWICKLEY, Pa., supply and pump wells *E News* Aug 3-**89**
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SHREVEPORT, La., supply and sewerage *E Rec* Apr 5-**90**
SOUTHAMPTON, England, water softening plant, inset *E News* * Apr 16, Matthews, insets *Inst C E* * v 108 -**92**
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VERSAILLES, France, supply *E News* May 2; Fanning *E Rec* May 16-**91**
VICKSBURG, Miss., settling basins, Delafield, inset *Am C E* * v 21 -**89**

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WARSAW supply *E Rec* * Jan 2-**92**
WASHINGTON, D. C., supply *E Rec* Jan 30-**92**
YOKOHAMA, Japan, Turner *Eng* Feb 21 *The Eng* 21 *E News* Mar 8, insets *Inst C E* * v 100 -**90**
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Watson, Robert *Inst C E* v 104 -**91**

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Weatherhead, Patrick L. *Inst C E* v 92 -**88**

Weaver, John J. *F Inst* Aug -**91**

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Weaving shed design *Iron Age* * Dec 8, dis. *Am M E* * v 13 -**92**

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Weber, Wilhelm E., pors. *El Rev Lond* * July 10 *Sc Am Sup* * July 25-**91**

Webster, William *Inst C E* v 92 -**88**

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Weighing machines, Kent *F Inst* Sep -**88**; Airy, dis., insets (very full) *Inst C E* * v 108 -**92**; Aut. W. Mach. Co., legal decis. *The Eng* Dec 21-**88**

Weir, Thomas, por. *E & Min* * Mar 21-**91**

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Wheels, Cloud's boltless *R Gaz* * Mar 20; wheels linked with bell crank * Nov 21-**91**
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Whistling buoy *E News* * Nov 15-**90**. See also HARBOR eng.
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Whitworth, Joseph, por. (full) *Inst C E* * v 91 -**88**
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Wilson, George *Inst C E* v 91 -**88**
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Windmill for elec. purposes, Blyth *El Rev Lond* * Aug 12-**92**; for producing elec. light, Cape de la Heve *Sc Am Sup* * Aug 3-**89**
Winslow, Arthur, por. *E & Min* * Jan 23-**92**
Windom, William, por. *E & Min* * Feb 7-**91**
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